State of Florida

Unified Watershed Assessment
and
Watershed Restoration Priorities

Watershed Management Program
Division of Water Facilities

The Unified Watershed Assessment Process

Background Information

The Unified Watershed Assessment (UWA) and Watershed Restoration Priorities are components of the Clean Water Action Plan (CWAP), which is a comprehensive plan for protection of the nation's watersheds that was released by the U.S. Environmental Protection Agency and the U.S. Department of Agriculture earlier this year. The State of Florida's UWA and priority list were developed in accordance with the "Final Framework for Unified Watershed Assessments, Restoration Priorities, and Restoration Action Strategies," dated June 9, 1998. As outlined in the framework document, the UWA consists of a map of the 51 basins in the state (defined as the 8-digit hydrologic unit code) showing watersheds in most need of restoration, and a description of the process and rationale used in the assessment (this document).

Sources of Information

As directed in the framework document, the Department of Environmental Protection (Department) relied primarily on existing sources of information to develop the UWA. Key sources of information for the assessment were the State's 1996 305(b) Report and 1998 303(d) List of impaired waters. To determine the watersheds in most need of restoration, the Department overlaid the State's 303(d) list with the Environmental Quality Incentives Program (EQIP) priority watersheds developed by the Natural Resource Conservation Service, and the State's list of Surface Water Improvement and Management (SWIM) waters[1].

Although the Department primarily used readily available surface water data during development of this initial UWA, the Department envisions the UWA as an iterative process and plans to use additional data sources (including ground water and drinking water data) in subsequent years. The Department also plans to coordinate subsequent UWAs with neighboring states (Georgia and Alabama) and tribal governments in Florida to attain other relevant data they may have.

Watershed Categorization

The framework document directed states to categorize all of their major river basins as Category I (Watersheds in Need of Restoration), Category II (Watersheds Meeting Goals, Including Those Needing Action to Sustain Water Quality), Category III (Watersheds with Pristine or Sensitive Aquatic System Conditions on Lands Administered by Federal, State, and Tribal Governments), or Category IV (Watersheds With Insufficient Data to Make an Assessment). However, no watersheds were deemed to have insufficient data (Category 4), and all Florida watersheds were categorized as either Category I or II.

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[1] SWIM is a watershed management program enacted by the 1987 Florida Legislature to set priorities for the protection and restoration of Florida's waters.

Because of Florida's extensive land acquisition programs, almost every watershed in the state includes some publicly owned waters. Accordingly, Florida chose to prioritize watersheds independent of land ownership. High priority publicly owned lands like the Everglades were categorized as Category I.

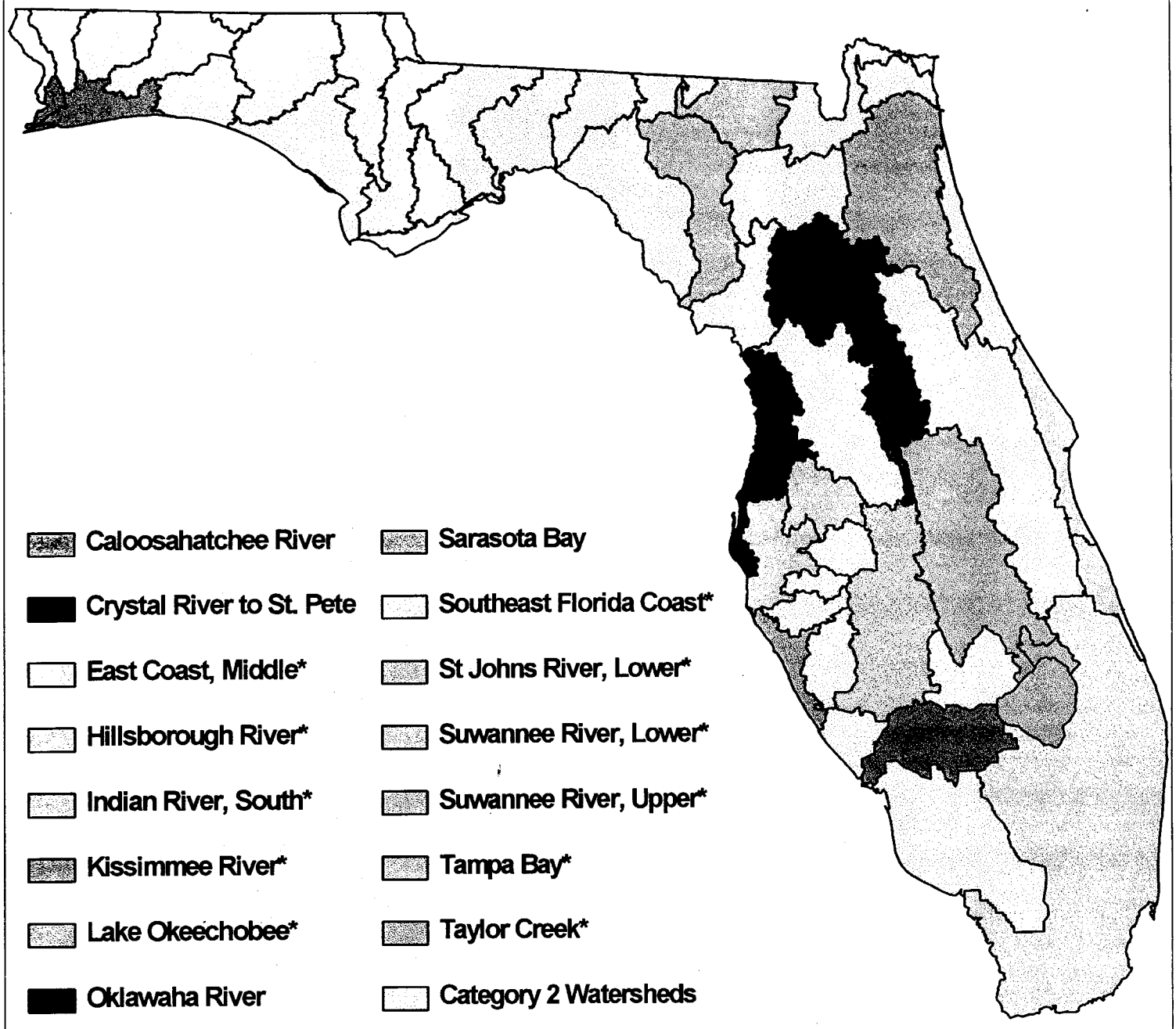
It should be noted that almost all state watersheds, including those designated Category II, have some impaired waters. While the Department tried to follow the general guidance provided in the framework document for defining Category I watersheds (nonattainment of applicable standards in 15-25% of the assessed waters in the watershed), the Department ultimately decided that assessments based on set criteria or composite scores are not appropriate on this large of a scale (unless the available data are from an unbiased monitoring network). Additionally, the State's SWIM Program already targets resources towards water bodies most in need of restoration. Therefore, the Department took into account both the number of waters in the watershed that partially meet or do not meet applicable standards[2] and the previously established restoration priorities for waters in the watershed. As a result, the majority of the Category I watersheds have previously been identified as SWIM Program priority waters by the State's Water Management Districts.

Public Participation

The Department requested general public input on the UWA in a notice published in the July 31 Florida Administrative Weekly (FAW) and then noticed the draft Watershed Restoration Priorities in the September 4 FAW. Comments were received from a variety of stakeholders, including other state agencies, Water Management Districts, local governments, and the Charlotte Harbor National Estuary Program. In response to comments received, the Department changed several watersheds (Sarasota Bay, the Peace River, the Caloosahatchee River, Crystal River to St. Pete, and the Oklawaha River) from Category II to Category I.

[2] Watersheds where the vast majority of impaired waters were those that partially meet designated uses ("fair" waters, as opposed to "poor" waters that do not meet designated uses) were generally not categorized as Category I even if greater that 25% of the assessed waters were fair.

Unified Watershed Assessment



- Caloosahatchee River
- Crystal River to St. Pete
- East Coast, Middle*
- Hillsborough River*
- Indian River, South*
- Kissimmee River*
- Lake Okeechobee*
- Oklawaha River
- Peace River
- Pensacola Bay
- Perdido Bay
- Sarasota Bay
- Southeast Florida Coast*
- St Johns River, Lower*
- Suwannee River, Lower*
- Suwannee River, Upper*
- Tampa Bay*
- Taylor Creek*
- Category 2 Watersheds

* High Priority Category 1 Watersheds

State of Florida Unified Watershed Assessment

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Watershed Restoration Priorities for the State of Florida

Identification of Category I Watersheds Most in Need of Restoration

The Category 1 Watersheds (listed by their eight-digit hydrologic unit, with major tributaries noted) prioritized for restoration in 1999-2000[1] are:

1) Lake Okeechobee (3090201), including two tributaries that are also watersheds [Kissimee River (3090101) and Taylor Creek (3090102)]

2) Southeast Florida Coast (3090202), including the Everglades and the St. Lucie River

3) Tampa Bay (31100206), including the Hillsborough River (3100205)

4) Lower Suwannee River (3110205), including the Upper Suwannee River (3110201)

5) The Lower St. Johns River (03090103)

6) Indian River Lagoon [South Indian River (3080203) and Middle East Coast (3030202)]

Preliminary Schedule for Remaining Category I Watersheds

The remaining Category I watersheds will be addressed as part of the Department of Environmental Protection's (Department) Watershed Management Program (WMP), which is a watershed-based management program under development by the Department's Division of Water Facilities (DWF). The WMP is only one component of the State's multi-faceted watershed management programs that include the Surface Water Improvement and Management (SWIM) Program conducted by the State's Water Management Districts (WMDs) and the Department's Ecosystem Management Program. The WMP is being designed by the DWF to complement these other initiatives while specifically addressing watershed responsibilities of the division.

Key components of the WMP are a 5-year basin management cycle and a statewide basin management schedule that ensures that all of the State's basins will be addressed every five years. While the basin schedule has not been finalized, the current draft schedule calls for the basin management cycle to be initiated in each of the remaining Category I waters as follows: Sarasota Bay – 2002; Peace River and Caloosahatchee River – 2002; Pensacola Bay and Perdido Bay – 2003; and Crystal River to St. Pete – 2004.

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[1] It should be noted that restoration activities have already been initiated in the majority of the listed waters as part of state (primarily the SWIM program) and local initiatives. This "start date" reflects the initiation of federal funding of restoration activities in these watersheds under the Clean Water Action Plan.

Key products of the WMP are Basin Management Plans for each watershed. These plans will guide management actions in the watershed, including implementation of Total Maximum Daily Loads and selection of watershed restoration activities.

Sources of Information

As directed in the framework document, the Department relied primarily on existing sources of information to develop the UWA. Key sources of information for the assessment were the State's 1996 305(b) Report and 1998 303(d) list of impaired waters.

Process for Selecting Priority Watersheds

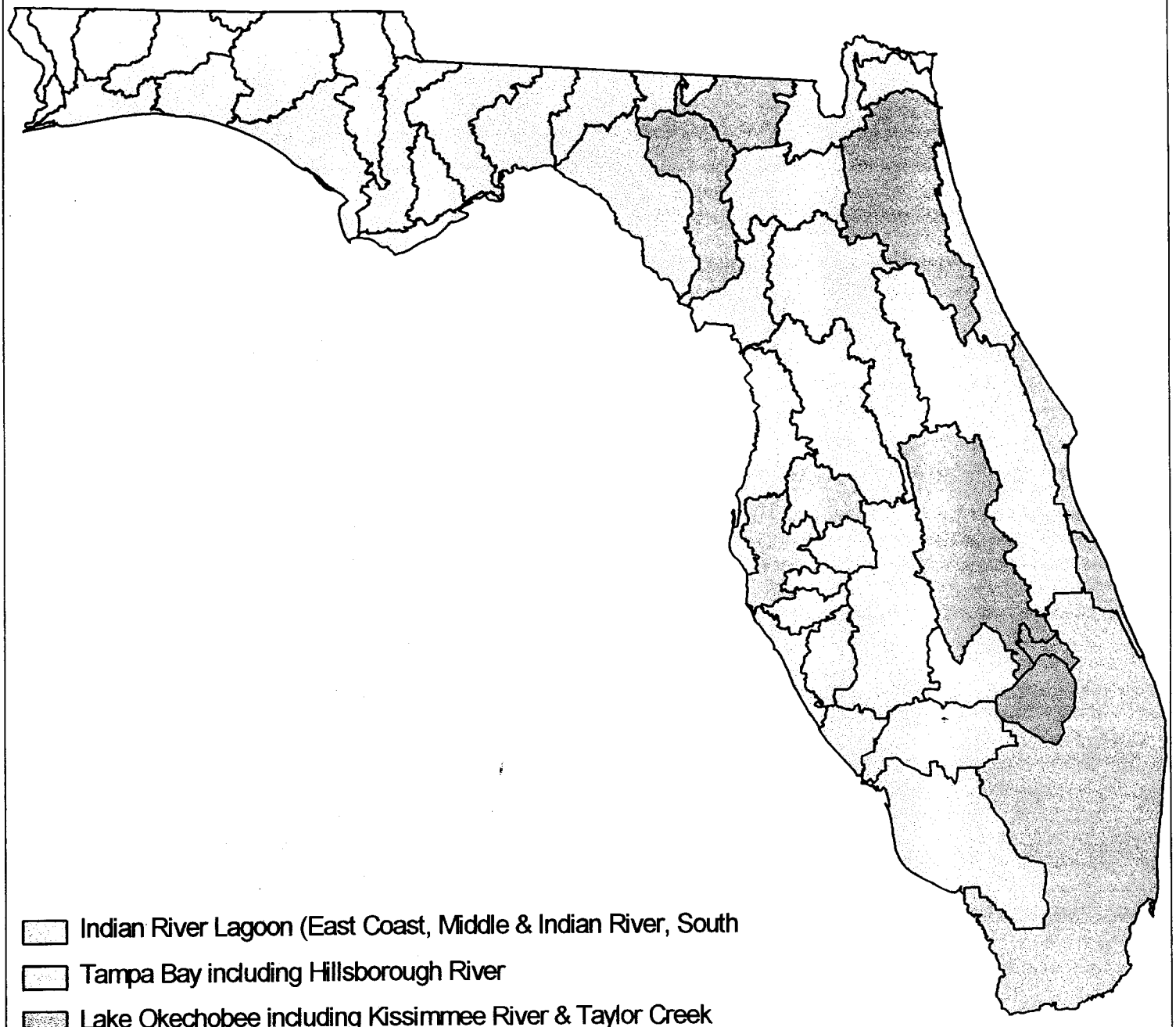
To determine the watersheds in most need of restoration, the Department overlaid the State's 303(d) list with the priority watersheds developed by the NRCS and the State Technical Committee. The Department gave higher priority to watersheds with water quality impairment that impacted public health, including impacts on drinking water supplies and impacts from harmful algal blooms. For example, Lake Okeechobee was selected, in part, because it is a major source of drinking water for South Florida. Similarly, the Suwannee River watershed, which has relatively good surface water quality, was prioritized for restoration because ground water nitrate concentrations in many springs and wells in the area exceed the drinking water standard.

The Department also evaluated previously established restoration priorities for waters in the watershed. All of the priority watersheds have previously been identified SWIM Program priority waters by the State's WMDs. The attached basin descriptions list the SWIM waters in each priority watershed and describe the specific water quality issues for the watershed.

Public Participation

The Department requested general public input on the UWA in a notice published in the July 31 Florida Administrative Weekly (FAW) and then noticed the draft Watershed Restoration Priorities in the September 4 FAW. Comments were received from a variety of stakeholders, including other state agencies, WMDs, local governments, and the Charlotte Harbor National Estuary Program. In response to comments received, the Department added the Middle East Coast Watershed to the priority list as part of the Indian River Lagoon.

Watershed Restoration Priorities



- Indian River Lagoon (East Coast, Middle & Indian River, South
- Tampa Bay including Hillsborough River
- Lake Okechobee including Kissimmee River & Taylor Creek
- Southeast Florida Coast
- St. Johns River, Lower
- Suwannee River, Lower & Suwannee River, Upper

State of Florida Watershed Restoration Priorities

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Lake Okeechobee Basin

Water Quality Summary

Lake Okeechobee's overall water quality is fair due to elevated nutrient and chlorophyll levels. Recent trends in the last 10 years shows fairly stable levels of nutrients and chlorophyll. Only one lake segment immediately below Taylor Creek shows improvement, probably due to the reduction of nutrients from dairy farms in the Taylor Creek Basin.

Within Lake Okeechobee and the surrounding drainage basin, 45 303(d) listed segments have been identified. Dissolved oxygen, nutrients, and coliforms are the most frequently listed parameters of concern. Metals, biochemical oxygen demand, and turbidity have also contributed to impairment.

Several management committees have been formed to address water quality and quantity in Lake Okeechobee and contributing basins including are the Central and Southern Florida Restudy. In May of this year, the Lake Okeechobee Issue Team was formed by the South Florida Ecosystem Restoration Working Group. Its purpose is to develop federal, state and stakeholder consensus on an action plan to immediately accelerate progress toward existing phosphorus reduction goals.

Basin Description

Lake Okeechobee is a large, shallow lake located in the center of southern Florida. Florida's largest lake, Lake Okeechobee covers approximately 700 square miles and is the second largest lake located entirely within the United States. Water is withdrawn from Lake Okeechobee for public water supply and agricultural irrigation, and water from the lake also serves to recharge groundwater and provide water to the Everglades.

According to SFWMD (1997), the lake's drainage basin covers more than 4,600 square miles. Inflows include rainfall (47%), the Kissimmee River (25%), and smaller inflows from the Indian Prairie Canal, the Harney Pond Basin, Fisheating Creek, and Taylor Creek/Nubbin Slough. Outflows include evapotranspiration (64%), the Caloosahatchee River to the west (12%), the St. Lucie Canal to the east (4%), and four agricultural canals (Miami, North New River, Hillsboro, and West Palm Beach canals), which drain south into the Everglades.

A summary of key basin characteristics includes:

Drainage Area	4,600 square miles
Major Land Uses	Agriculture, wetlands, improved pasture
Population Density	Low
Major Cities	Moore Haven, Clewiston, Pahokee, Okeechobee, Belle Glade, South Bay
Major Counties	Glades, Hendry, Martin, Okeechobee, Palm Beach
Major Tributaries	Kissimmee River, Indian Prairie Canal, Harney Pond Basin, Fisheating Creek, Taylor Creek/Nubbin Slough
OFW Waterbodies	
SWIM Waterbodies	Lake Okeechobee/Kissimmee River
Origin of Basin Water	47 % rainfall, 25% Kissimmee River, remainder smaller surface water inflows

Source of Public Water Supply	Six surface water withdrawals located along the southern margin of the lake servicing the communities of Okeechobee, Belle Glade, Pahoka, Bryant, South Bay, and Clewiston

Hydrogeologic Description

- Lake Okeechobee is part of a larger system known as the Kissimmee-Okeechobee-Everglades System. Historically, the sluggish, meandering river system emptied into a high, shallow lake that slowly released water to a 50 mile wide, 125 mile long "River of Grass," the Everglades, which flowed south across the land to mangrove swamps and the Florida Bay.
- Prior to human development in Florida, the hydrology of Lake Okeechobee was coupled directly to that of the meandering Kissimmee River and its marsh ecosystem in the northwest, and to the great expanse of Everglades marsh in the south. During periods of high rainfall, water exited the lake at its south end as a broad sheet flow into the Everglades ecosystem. Today, the lake is entirely surrounded by an earthen dike and disconnected from the Everglades marsh. Water levels in the lake now are much lower than under natural conditions, and a marsh zone occupies about 25% of the lakes surface area along the southern and western shores in a region that was once under water (SFWMD, 1997).
- The Floridan and surficial aquifers underlie the Lake Okeechobee Basin, separated by an intermediate confining unit. The Floridan aquifer system is deep below the land surface. The top of the Floridan aquifer system varies between about 500 feet and over 900 feet below MSL in the Lake Okeechobee Basin (FGS, 1991). The water is saline, and not suitable for potable use. Total dissolved solids generally exceed 1000 mg/l (FGS, 1992). The surficial aquifer system is used for ground water supply in the Lake Okeechobee Basin. The surficial aquifer system ranges between 10 and 300 feet thick, and is composed of permeable sand, limestone, and shell beds with less permeable deposits of silt that serve to form a leaky confining unit for portions of the aquifer system.
- Because the surficial aquifer occurs under unconfined to partially confined conditions, there is a high potential for ground water contamination from activities at the land surface. The City of Moore Haven suffered the loss of one of its two municipal supply wells in 1986 because of contamination subsequently traced to a nearby fertilizer manufacturing facility. The Florida Steel Superfund Site, northwest of Indiantown in Martin County, contaminated ground water with waste piles of emission control dust.

Water Quality Status

- In the 1980's, several widespread algal blooms and at least one major fish kill led to the investigation and analysis of the lake's problems. The Lake Okeechobee Technical Advisory Committee, formed to assess the situation and recommend solutions, determined that phosphorous from dairies and agriculture was a major cause of the algal blooms and that levels should be reduced by 40 percent (SFWMD, 1997).
- According to SFWMD (1997), two-thirds of the proposed 40 percent reduction in Lake Okeechobee phosphorous level has been achieved.
- Review by SFWMD of historic (1973-1992) lake and tributary inflow water quality (SFWMD, 1997) indicated that the lake and its major inflows generally comply with applicable state water quality criteria. Exceedences of water quality criteria included low DO and high iron concentrations. Both of these may be naturally occurring conditions. Criteria exceedences for trace metals and organic contaminants were rare in lake inflows.

Water Quality Trends

- 10 waterbodies were assessed for trends – 8 in the lake and 2 in the creek/canals next to the lake. One lake waterbody showed improvement and one canal segment showed degradation. The other 8 waterbodies showed no change.
- The lake segment closest to Nubbin Slough/Taylor Creek on the northeast corner of the lake has improving levels of nutrients, probably due to the reduction of dairy farm related runoff in the above mention creeks.

Point and Nonpoint Sources of Pollution

- According to the Lake Okeechobee SWIM Plan Update (SFWMD, 1997), the vast majority of nutrient loading to the lake comes from nonpoint sources, with only a minor contribution from the point sources discharging to the system.
- Point sources within the Lake Okeechobee Basin include 69 permitted industrial waste facilities, mostly power plants and dairies, and 121 domestic wastewater facilities.
- Nonpoint sources in the Lake Okeechobee Basin include urban and rural stormwater runoff, and septic tank effluent.
- The predominant land use in the Lake Okeechobee Basin is agriculture. Nutrients from agricultural operations have affected the ecological condition of the lake. Major pollution sources for the lake include runoff from ranch and dairy operations in the north and back pumping of runoff from row crops and sugar cane to the south. As a result, depending on location and seasonal rainfall, the lake receives varying amounts of nutrients, substances creating biological oxygen demand, bacteria, and toxic materials
- Several programs have been implemented to achieve the phosphorous reduction in runoff from the watershed. These include implementation of Best Management Practices, including fencing cows away from streams; the FDEP Dairy Rule, which requires construction of waste treatment systems for barn wastewater and runoff from high-intensity milk herd holding areas; the Dairy Buy-out Program, which provided an option for farmers who were unable or unwilling to comply with the Dairy Rule; and a regulatory program established by SFWMD to limit phosphorous concentration in runoff from non-dairy land uses.

Reference Reports

- Surface Water Improvement and Management Plan Update for Lake Okeechobee, South Florida Water Management District, 1997
- Water Quality Assessment for the State of Florida (with five technical appendices), Florida Department of Environmental Protection, Bureau of Surface Water Management, 1996
- Florida's Groundwater Quality Monitoring Program Background Hydrochemistry, Florida Geological Survey Special Publication No. 34, 1992
- Florida's Groundwater Quality Monitoring Program Hydrogeological Framework, Florida Geological Survey Special Publication No.32, 1991

Basin Water Quality Experts

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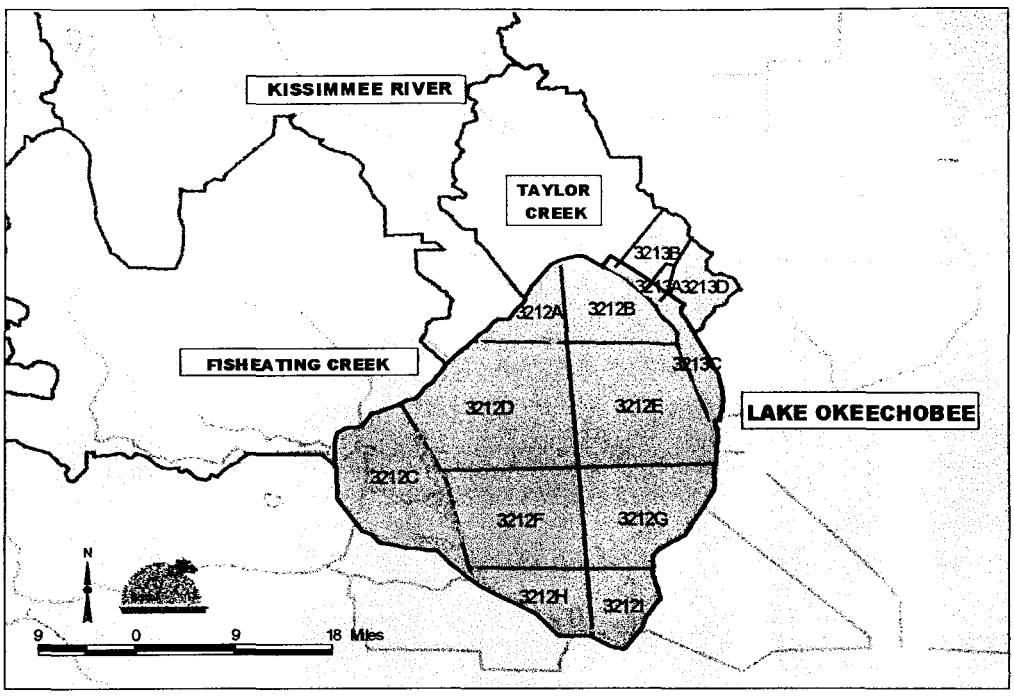
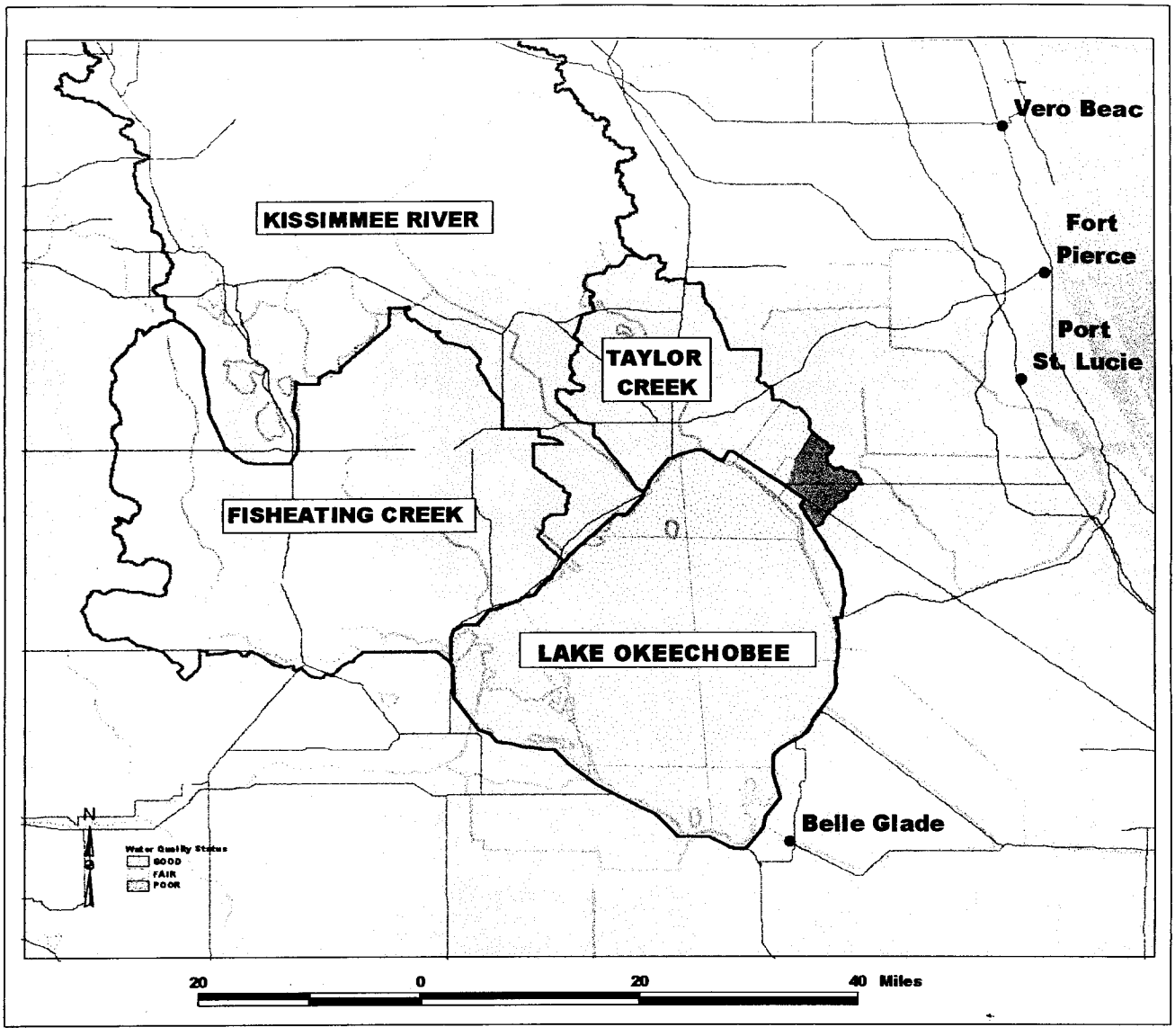


Assessed Watersheds in the Lake Okeechobee Basin[1]

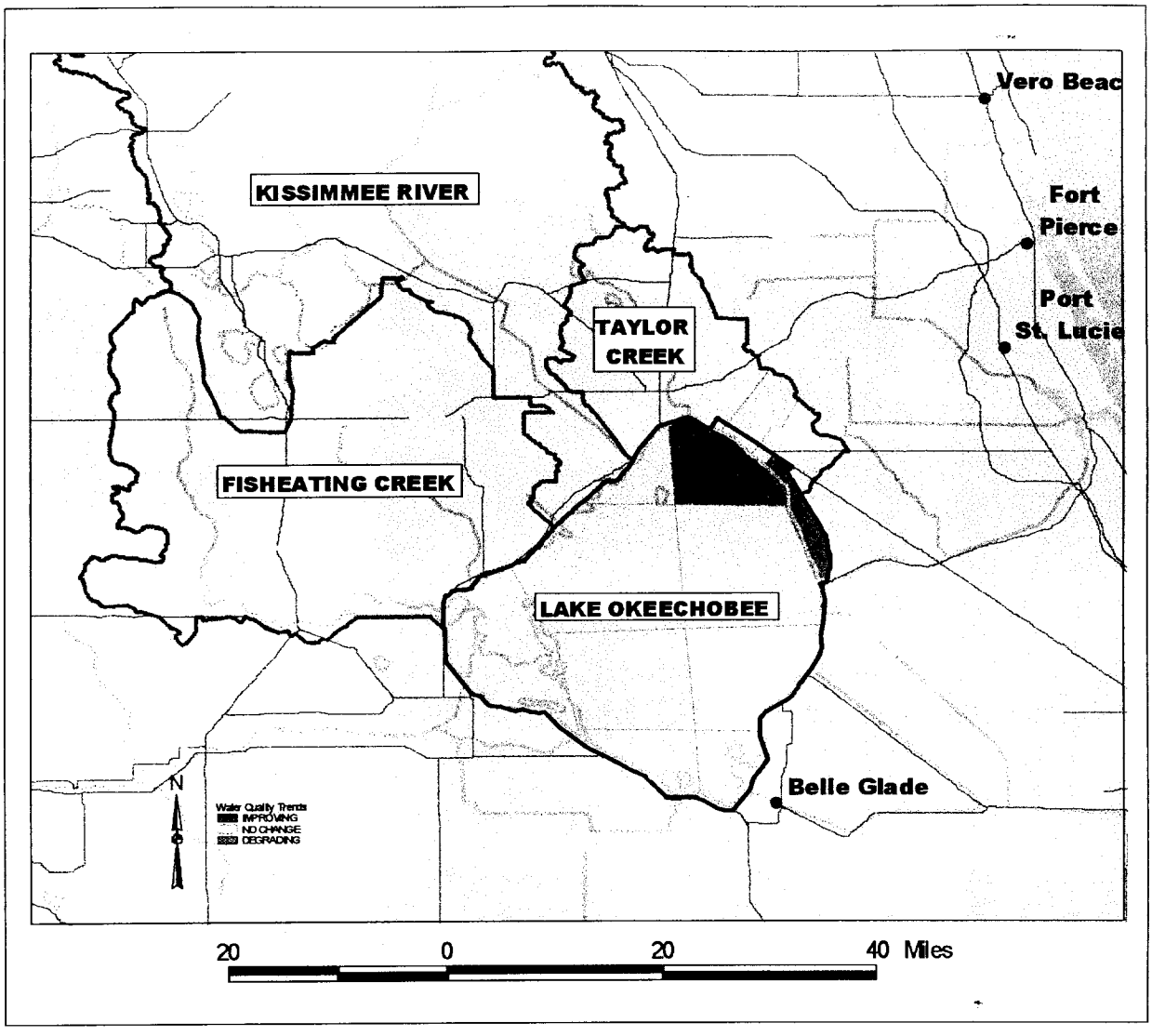
Waterbody ID	Waterbody Type	Watershed Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
3213B	Stream	Henry Creek	Fair	Stable	High	Dissolved Oxygen, Nutrients, Coliforms
3213D	Stream	Myrtle Slough	Poor		High	Dissolved Oxygen, Nutrients, Coliforms
3212B	Lake	Lake Okeechobee	Fair	Improving	High	Coliforms, Nutrients
3212A	Lake	Lake Okeechobee	Fair	Stable	High	Dissolved Oxygen, Nutrients, Chlorides
3213A	Stream	Lettuce Creek	Fair		High	Dissolved Oxygen, Nutrients
3213C	Stream	S-135	Fair	Degrading	High	Dissolved Oxygen, Nutrients
3212D	Lake	Lake Okeechobee	Fair	Stable	High	Dissolved Oxygen, Un-ionized Ammonia, Iron, Nutrients
3212E	Lake	Lake Okeechobee	Fair	Stable	High	Iron, Nutrients
3212C	Lake	Lake Okeechobee	Fair	Stable	High	Dissolved Oxygen
3212G	Lake	Lake Okeechobee	Fair		High	Un-ionized Ammonia, Iron, Nutrients
3212F	Lake	Lake Okeechobee	Fair	Stable	High	Dissolved Oxygen
3212H	Lake	Lake Okeechobee	Fair	Stable		
3212I	Lake	Lake Okeechobee	Fair	Stable	High	Nutrients

[1] The table identifies the watersheds (by name, waterbody type, and ID Number) in the Lower Suwannee River Basin that were assessed in 1998. Water Quality determinations for status and trend have been provided for each watershed. Watersheds with TMDL waterbodies are listed and the 1998 priority provided.



Water Quality - Status
Lake Okeechobee Basin
HUC Number 03090201
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauxe
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section



Water Quality - Trends
Lake Okeechobee Basin
HUC Number 03090201
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauxe;
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section

Southeast Florida Basin - Everglades

Water Quality Summary

The Everglades Agricultural Area (EAA) exhibits poor overall water quality as evidenced by low dissolved oxygen, and high nutrients and TOC. South of the EAA, the Water Conservation Areas (WCAs) have fair overall quality and the Everglade Areas further south and west exhibit good quality. Trend data show stable water quality during the last 10 years at 74% of the sites, improving quality at 19% of the sites.

The St. Lucie Canal at Stuart is fed from the south by the C44 Canal which originates at Lake Okeechobee. The quality of the canal/estuary ranges from good to poor with elevated phosphorus and low dissolved oxygen as the predominate problem. Increasing nitrogen trends have been found in the tidal portion.

According to the 1998 303(d) list, there are 37 segments in the WCAs, EAA, and Everglades Areas requiring Total Maximum Daily Loads (TMDL's). The most frequently listed parameters of concern include nutrients, coliforms, and dissolved oxygen, however chlorides, total suspended solids, biochemical oxygen demand, turbidity, un-ionized ammonia, and metals are also listed.

The Southeast Florida Basin, particularly the Everglades Water Conservation Areas and Everglades National Park is the focus of many restoration efforts. These include: the Everglades Forever Act, the Central and Southern Florida (C&SF) Project, South Florida Ecosystem Restoration Task Force, and the Governor's Commission for a Sustainable South Florida.

Basin Description

The Everglades and their associated drainages cover most of the southern end of the Florida Peninsula. The Everglades is the southern end of the Kissimmee-Lake Okeechobee-Everglades system. In its historic/natural condition, the basin was a vast, continuous wetland; water flowed slowly in a huge, shallow sheet from Lake Okeechobee south to Florida Bay. Over 130 miles from north to south, the elevation changes by only about 15 feet, an average of 1 inch per mile. This gradient is so flat that rainfall can reverse the direction of local surface water flow. Small differences in elevation can produce vast differences in vegetation and habitat.

The basin has been extensively modified from its historic condition. Southeastern Florida is crisscrossed by thousands of miles of canals and levees, all constructed in the last century. Controls center around Lake Okeechobee. Five major canals radiate from the lake to the Atlantic, and one major waterway, the Caloosahatchee River, flows to the Gulf. The Miami, North New River, Hillsboro, West Palm Beach, and St. Lucie Canals drain water to the southeast. Control structures at all the major canal junctions allow water flows to be managed for flood control, agriculture, aquifer recharge, water supply, and water delivery to the WCAs and Everglades National Park.

The Everglades system is a Surface Water Improvement and Management (SWIM) Plan priority waterbody. The area covered by the SWIM Plan includes the Everglades Agricultural Area (EAA), the Water Conservation Areas (WCAs), and Everglades National Park (ENP).

The EAA, located south of Lake Okeechobee within eastern Hendry and western Palm Beach Counties, consists of 1,122 square miles of highly productive agricultural lands drained from the rich organic peat and muck soils that underlay the historic marshland (South Florida Water Management District, 1992). Agricultural crops include mostly sugarcane, vegetables, and sod. Agriculture within the EAA has been

shown to be a major contributor of nitrogen and phosphorous loading to drainage canals. Drainage and runoff from the EAA supplies approximately 23% of the surface water that flows into the WCAs (South Florida Water Management District, 1992).

The WCAs are three major reservoir areas of natural Everglades vegetation that provide flood protection during the rainy season and store water during the dry season. Construction of the levees enclosing the WCAs began in 1953. WCA-1 covers 227 square miles and was designated as the Loxahatchee National Wildlife Refuge. WCA-2, which covers 210 square miles, is divided by a levee into two smaller areas, WCA-2A and WCA-2B. The largest WCA, WCA-3, covers 915 square miles, and is also divided into two parts: WCA-3A and WCA-3B.

A summary of key basin characteristics include:

Drainage Area	3,533 square miles
Major Land Uses	wetlands, agriculture
Population Density	low
Major Counties	Dade, Broward, Palm Beach, Hendry, and Martin
OFW Waterbodies (including tributaries)	Everglades National Park Biscayne National Park Big Cypress National Preserve Biscayne Bay State Aquatic Preserve Loxahatchee National Wildlife Refuge Loxahatchee River State Aquatic Preserve Rotenberger Tract (CARL project) Savanas State Reserve Northwest Fork of the Loxahatchee River
SWIM Waterbodies (including tributaries)	Lake Okeechobee Everglades National Park/Florida Bay Everglades Water Conservation Areas Biscayne Bay Savanas State Reserve
Origin of Basin Water	rainfall, canals, Kissimmee River Basin, Lake Okeechobee, groundwater inflow

Hydrogeologic Description

- Because of the flat topography in the Everglades, it is very easy for man to alter natural drainage patterns. Structures such as roads, levees and railways often form the divides between basins. Where such features are absent, basin boundaries may vary with the location of rainfall and operation of water control structures (South Florida Water Management District, 1992).
- The primary geological feature that controls regional hydrology is the permeability of underlying rock. Groundwater, surface water, and water management are all affected. In areas of high permeability, rainfall easily seeps into the underlying rock, but it also may return quickly to canals and streams and augment water levels in the canals and make flood control and land drainage difficult. In areas of low permeability, water moves into underlying rock less easily, but moves more slowly through the rock and provides a residual flow to canals and streams during dry periods. In some rock strata, water may travel considerable distances before re-emerging at the surface as springs or as seepage to canals (South Florida Water Management District, 1992).
- Three major hydrogeologic units have been identified in the Everglades area: the Floridan aquifer system, the intermediate confining unit, and the surficial aquifer system. The Floridan aquifer system is deep and contains water that is too mineralized for most uses. The intermediate confining unit separates the Floridan aquifer system from the surficial aquifer system. The surficial aquifer system, known as the Biscayne Aquifer, is the source of most of the potable water in the area. It is comprised of porous and permeable limestone and sandstone, sand, shell beds, and clayey sands.

Because of permeability differences between the interbedded materials which comprise the aquifer system, some zones within the surficial aquifer system are partially confined.

Water Quality Status and Point and Nonpoint Sources of Pollution

The Everglades is recognized as a unique ecosystem. It is also a unique basin, as far as basin assessments. First, it is enormous. Second, most surface waters in the basin are highly managed with controlled flows and water elevations. Third, some surface water stretches are as much as 60 miles long. Because the Everglades system is so highly changed from its natural condition, the water quality status and human impact sections are combined in this report.

- Before construction of water control structures in South Florida, water moved freely from Lake Okeechobee across the Everglades. According to the SWIM plan for the Everglades (South Florida Water Management District, 1992), the historic Everglades had water characterized by low nutrient levels. The main source of nutrients within the system was rainfall and infrequent flooding of Lake Okeechobee. Data cited by the SWIM plan indicate that Lake Okeechobee has been eutrophic for the last four to five thousand years, and that flooding in Lake Okeechobee would release these nutrients periodically to the Everglades system. Fire, large populations of wading birds, and oxidation of exposed muck soils during low water conditions also provided limited amounts of nutrients. Essentially, the Everglades system was nutrient limited before humans initiated change.
- The marshes that historically occupied the EAA have been largely replaced with agricultural crops. Agricultural drainage of these lands has resulted in the oxidation and subsidence of organic soils. Soil oxidation and the use of fertilizers have contributed nitrogen, phosphorous, and other constituents to the water that leaves the EAA.
- Water draining the EAA farmlands contains low DO concentrations, high concentrations of nitrogen, phosphorous, chloride, sodium, trace metals, high color, high specific conductivity, and occasional pesticide contamination (South Florida Water Management District, 1992).
- A health advisory recommending no consumption of largemouth bass because of mercury content has been issued for Water Conservation Areas 2A and 3A, portions of Everglades National Park and the Savannas. An advisory has also been issued for limited consumption in Water Conservation Area 1 and portions of Everglades National Park (305[b] Report, 1996).
- The L-8, West Palm Beach, Hillsboro, North New River, and Miami canals from Lake Okeechobee to the L4-L7 canals, which roughly define the Everglades Agricultural Area, have poor water quality with extremely high nutrient and low DO levels. Other problems include pesticides, biochemical oxygen demand, bacteria, and suspended solids. Agricultural runoff and overflow or seepage from sugar mills contribute pollution. In addition, between the L-8 ad West Palm Beach canals, sludge spreading operations may cause pollution (305[b] Report, 1996).
- Canals bordering the WCAs generally have very low DO levels typical of marsh waters. Nutrient levels at the marsh perimeter are elevated, probably from the breakdown of organic debris as well as agricultural drainage (305[b] Report, 1996).
- In May of 1994, the State of Florida passed the Everglades Forever Act (CH 94-115). The act sets into action a plan for restoring a significant portion of the Everglades ecosystem through a program of land acquisition, construction projects, research, and regulation. The legislated requirements of the Act addresses water quality, water quantity (may include hydroperiod), and the invasion of exotic species. One of the key features of the Act is the Everglades Construction Project (ECP). The ECP is a comprehensive program that improves the water quality reaching the WCAs and ENP, through the use of stormwater treatment areas and other hydrologic improvements.

Water Quality Trends

- 27 waterbodies were assessed for trends – 19% are improving, 7% are degrading, and 74% are stable.
- Improvements are occurring in a couple of the WCA areas where nutrients and turbidity are getting lower.

Reference Reports

- Water Quality Assessment for the State of Florida (with five technical appendices), Florida Department of Environmental Protection, Bureau of Surface Water Management, 1996
- Surface Water Improvement and Management Plan for the Everglades, Supporting Information Document, South Florida Water Management District, 1992

Basin Water Quality Experts

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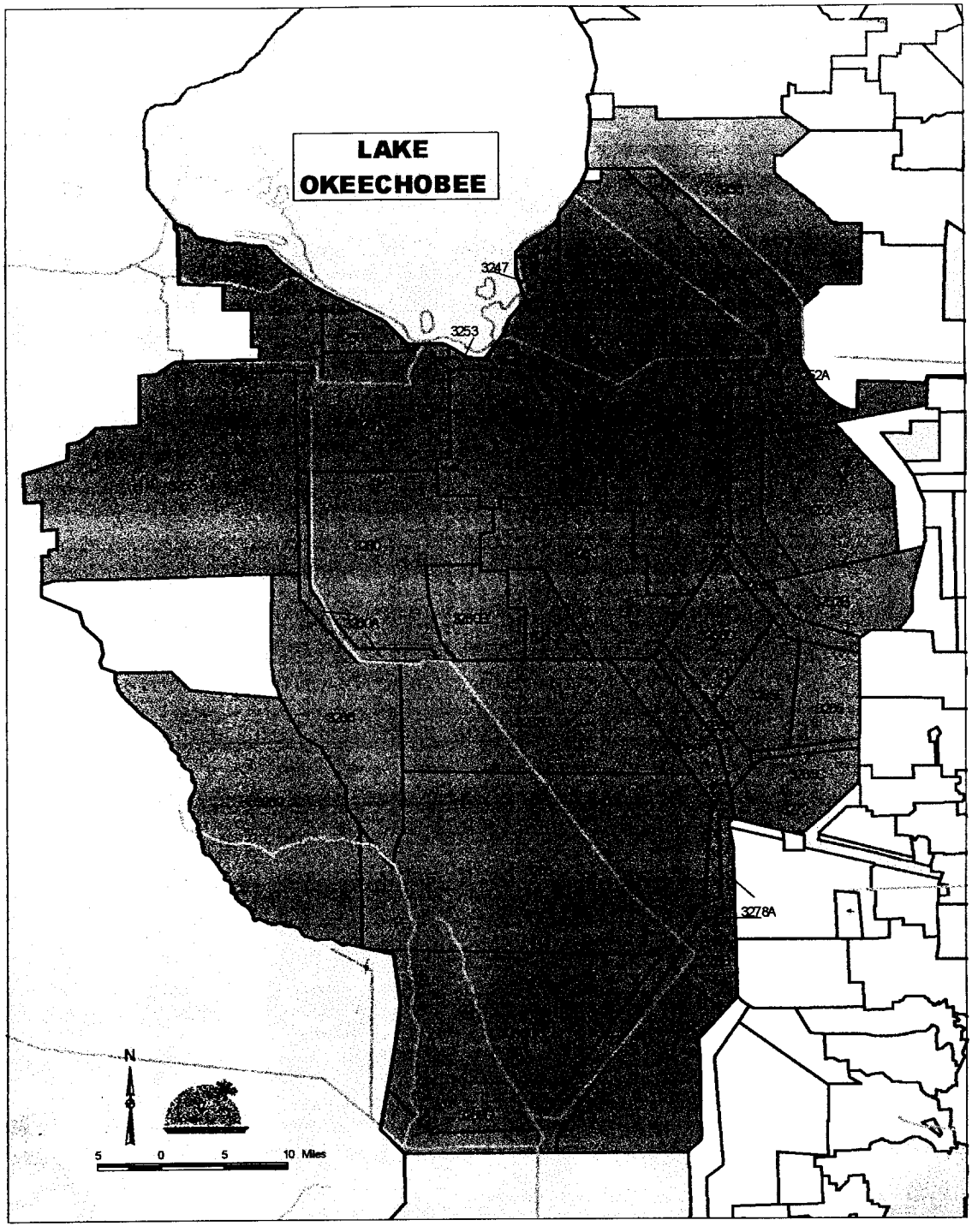


Southeast Florida Basin

Assessed Watersheds in the Southeast Florida Basin - Everglades

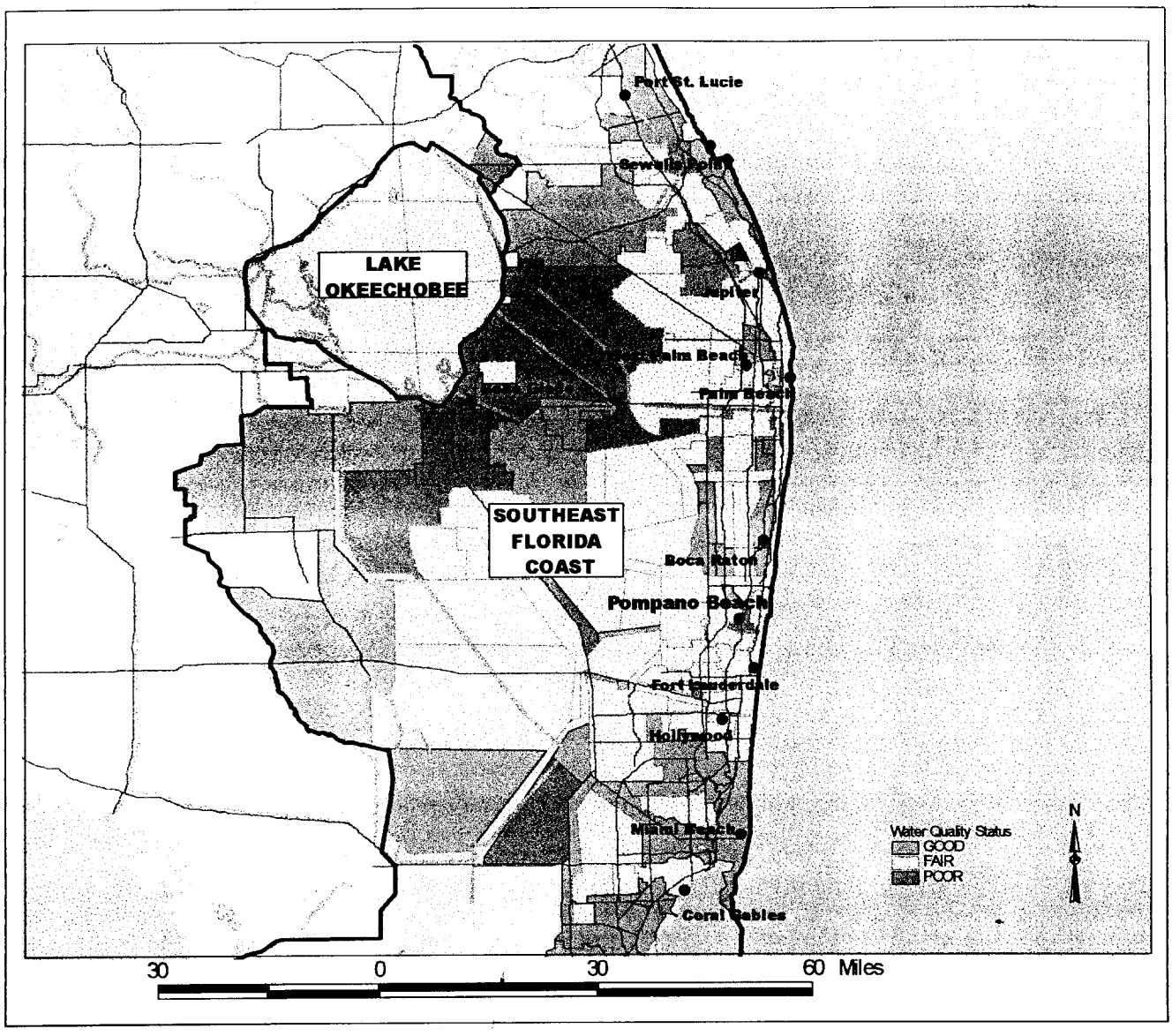
Assessed Watershed in the Southeast Florida Basin - Everglades[1]

Waterbody ID	Waterbody Type	Watershed Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
3233	Stream	L-8	Poor	Stable	High	Dissolved Oxygen, Nutrients, Turbidity, Mercury (Based on Fish Consumption Advisory)
3238	Stream	WEST PALM BEACH CANAL	Poor	Stable	High	Dissolved Oxygen, Coliforms, Un-ionized Ammonia, Nutrients, Turbidity, Total Suspended Solids, Mercury (Based on Fish Consumption Advisory)
3238A	Stream	OCEAN CANAL	Good	Stable		
3238B	Stream	KNIGHTS FARM FIELD2	Good	Improving		
3238E	Stream	M CANAL	Poor		High	Dissolved Oxygen, Nutrients
3244	Stream	EAST BEACH	Poor	Degrading	High	Dissolved Oxygen, Un-ionized Ammonia, Nutrients, Turbidity, Total Suspended Solids
3246	Stream	C-21	Fair	Improving	Low	Dissolved Oxygen, Nutrients
3247	Stream	715 FARMS	Poor	Stable	High	Dissolved Oxygen, Un-ionized Ammonia, Nutrients, Turbidity, Total Suspended Solids
3248	Stream	N. NEW RIVER CANAL	Poor	Stable	High	Dissolved Oxygen, Nutrients, Turbidity, Total Suspended Solids, Mercury (Based on Fish Consumption Advisory)
3248A	Stream	HILSSBORO CANAL	Poor		Low	Dissolved Oxygen, Coliforms, Un-ionized Ammonia, Nutrients, Turbidity
3249	Stream	EAST SHORE	Fair			
3250	Stream	S-236	Fair	Stable	Low	Dissolved Oxygen, Un-ionized Ammonia, Nutrients

[1] The table identifies the watersheds (by name, waterbody type, and ID Number) in the Lower Suwannee River Basin that were assessed in 1998. Water Quality determinations for status and trend have been provided for each watershed. Watersheds with TMDL waterbodies are listed and the 1998 priority provided.

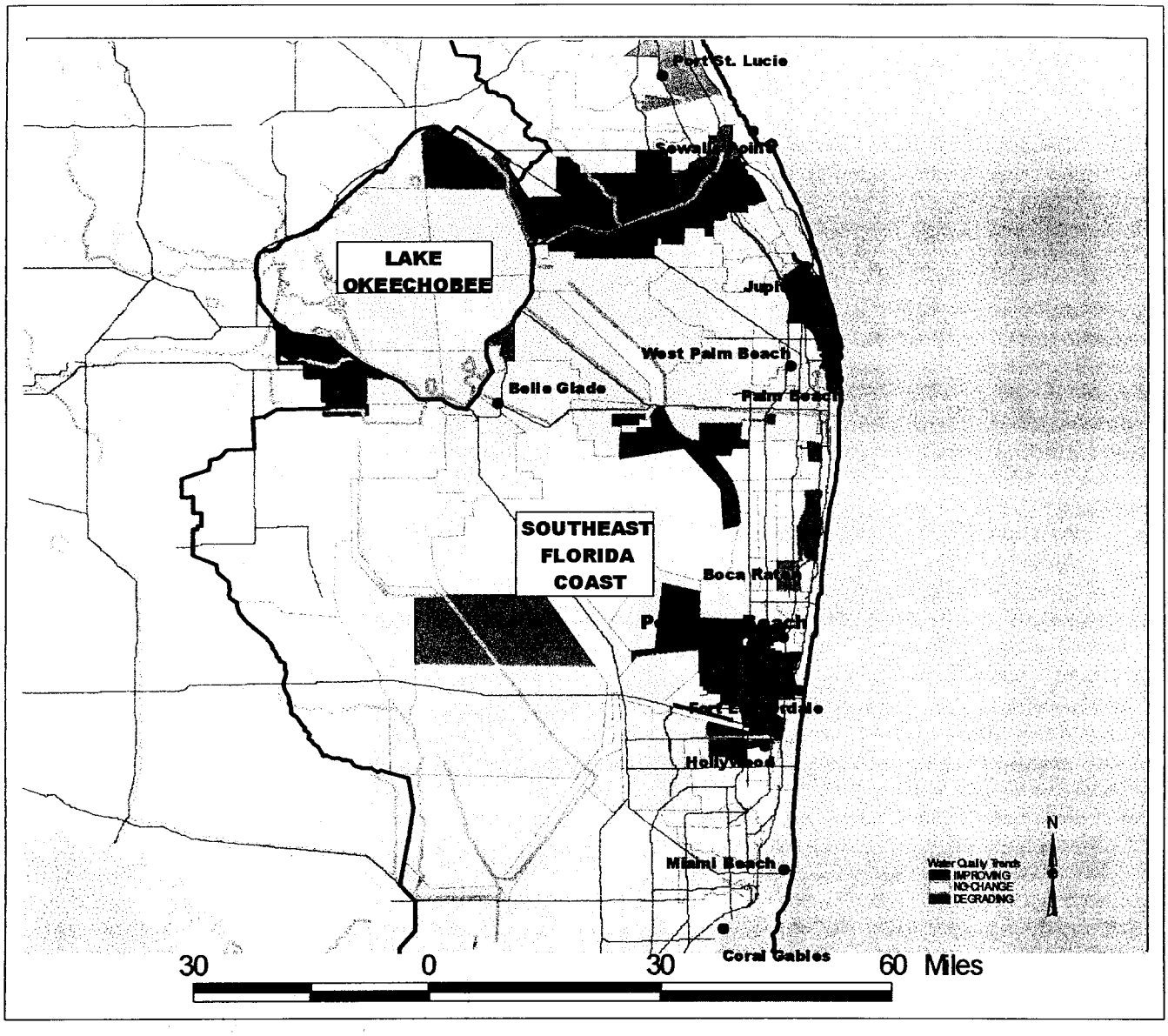
Waterbody ID	Waterbody Type	Watershed Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
3251	Stream	S-3	Good		High	Dissolved Oxygen, Nutrients, Turbidity, Mercury (Based on Fish Consumption Advisory)
3252	Stream	WCA1 CENTER SECTOR	Fair		Low	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
3252A	Stream	KNIGHTS FARM FIELD1	Poor		High	Nutrients
3252B	Stream	KNIGHTS FARM FIELD3	Poor		High	Nutrients
3252C	Stream	WCA1 NORTH SECTOR	Poor	Improving	High	Dissolved Oxygen, Coliforms, Nutrients, Total Suspended Solids
3252D	Stream	WCA1 WEST SECTOR	Fair		Low	Dissolved Oxygen
3252E	Stream	WCA1 SOUTH SECTOR	Fair		Low	Dissolved Oxygen, Nutrients
3253	Stream	SOUTH BAY	Poor	Stable	High	Dissolved Oxygen, Un-ionized Ammonia, Nutrients
3254	Stream	HILLSBORO CANAL	Good		Low	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
3255	Stream	C-139	Good			
3260	Stream	S-8	Poor	Stable	High	Dissolved Oxygen, Mercury, Nutrients, Mercury (Based on Fish Consumption Advisory)
3260A	Stream	L-3	Fair	Stable	Low	Dissolved Oxygen, Nutrients
3260B	Stream	HOLEY LAND	Fair			
3263	Stream	S-7	Fair		High	Dissolved Oxygen, Mercury, Nutrients, Turbidity, Mercury (Based on Fish Consumption Advisory)
3263A	Stream	HOLEY LAND	Fair			
3265	Stream	WCA2A EAST SECTOR	Fair	Improving	Low	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
3265A	Stream	WCA2A S-10 PERIMETER	Fair	Stable	Low	Dissolved Oxygen, Coliforms, Un-ionized Ammonia, Nutrients

Waterbody ID	Waterbody Type	Watershed Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
3265B	Stream	WCA2A SW PERIMETER	Poor	Stable	High	Dissolved Oxygen, Coliforms, Nutrients, Cadmium
3265C	Stream	WCA2A L-35B PERIMETER	Good	Improving	Low	Dissolved Oxygen, Cadmium, Nutrients
3265D	Stream	WCA2A NORTHWEST SECTOR	Fair			
3265E	Stream	WCA2A CENTER SECTOR	Fair	Stable	Low	Dissolved Oxygen, Nutrients
3266	Stream	L-28 INTERCEPTOR	Good	Stable	Low	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
3268	Stream	WCA3A CENTER SECTOR	Fair	Stable	Low	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
3268A	Stream	WCA3A US27 PERIMETER	Fair	Stable	Low	Dissolved Oxygen, Nutrients
3268B	Stream	WCA3A NORTH SECTOR	Fair	Degrading	Low	Dissolved Oxygen, Nutrients
3268C	Stream	WCA3A SOUTH SECTOR	Good			
3268D	Stream	WCA3A US41 PERIMETER	Fair	Stable		
3269	Stream	L-28 GAP	Good	Stable	Low	Dissolved Oxygen
3272	Stream	CONSERVATION AREA 2B	Fair	Stable	Low	Dissolved Oxygen, Nutrients
3278	Stream	WCA3B	Poor		High	Dissolved Oxygen, Mercury (Based on Fish Consumption Advisory)
3278A	Stream	WCA3B S-333	Fair	Stable	Low	Dissolved Oxygen, Nutrients
3278B	Stream	WCA3B MIAMI CANAL	Good	Stable	Low	Dissolved Oxygen, Nutrients



Water Quality - Status
Southeast Florida Basin
HUC Number 03090202
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauxe;
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section



Water Quality - Trends
Southeast Florida Basin
HUC Number 03090202
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauxe;
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section

Tampa Bay Basin

Water Quality Summary

Water quality in the Tampa Bay area has gone through a cycle of degradation in the 1960's and 70's due to increasing industrial and domestic waste and urban runoff and improvements in the 80's and 90's due to decreased nutrient loads into the system. Much of this improvement is related to increased treatment at the City of Tampa's Howard F. Curren Advanced Wastewater Treatment Plant, which has significantly reduced nutrient loading to the bay.

Trend data for the basin generally indicates that most assessed waterbodies are improving. With 42 waterbodies assessed for trends, 57% are improving, 12% are degrading, and 31% are stable. The Tampa Bay estuaries have shown a remarkable improvement in nutrient and chlorophyll levels, resulting in increased water clarity and improved seagrass growth. Delaney Creek, one of the poorest water quality streams in the basin, shows continued improvement due to enforcement actions against industrial dischargers to the stream.

The 1998 303(d) list identifies 47 water segments in the Tampa Bay Basin and 21 water segments in the Hillsborough River Basin that are not fully meeting designated uses. The primary parameters of concern are dissolved oxygen, nutrients, and coliforms. The Department of Environmental Protection recently completed a TMDL for nitrogen for the bay, based on the Tampa Bay Estuary Program's (formally the National Estuary Program) nitrogen management goal.

Various government agencies are addressing pollution problems in these basins. Water segments on the 303(d) list in these basins are being targeted for TMDL development by the Department. Currently the Tampa Bay Estuary Program and the SWIM program of the Southwest Florida Water Management District are working in cooperation to address resource management issues in Tampa Bay and some of the bay's tributaries, including the Hillsborough River. Management activities are focused on improving water quality conditions by reducing nutrient loadings and restoring aquatic habitats, such as seagrasses, mangroves, and salt marshes. Through the Estuary Program, local governments are identifying additional management practices to control stormwater loadings to the bay. The Estuary Program along with participating government agencies are also evaluating ways to address sediment contamination in areas of the bay as well as funding research on atmospheric deposition, which is considered to be a major source of nitrogen to the bay.

Basin Description

Tampa Bay, a multi-lobed (roughly Y-shaped) estuarine system, opens into the Gulf of Mexico about midway down the west central coast of peninsular Florida. The bay is often divided into sub-areas: Old Tampa Bay, Hillsborough Bay/MacKay Bay, Middle Tampa Bay, Lower Tampa Bay, Boca Ciega Bay, Terra Ceia Bay and the Manatee River Estuary. Variations in topography and in chemical and physical properties are used to subdivide the system.

Tampa Bay is approximately 35 miles long and 10 miles wide, and covers about 398 square miles, including contiguous wetlands. The estuary is rather shallow, with an average depth of 12 feet and a maximum natural depth of about 90 feet in Eggmont Channel at the mouth of the Bay. About 90 percent of the Bay is less than 22 feet deep. Tampa Bay is Florida's largest open water estuary.

A summary of key basin characteristics include:

Drainage Area	2,200 square miles
Major Land Uses	urban development
Population Density	high
Major Cities	Bradenton, Tampa, St. Petersburg, Clearwater, Tarpon Springs
Major Counties	Manatee, Hillsborough, Pinellas
Major Tributaries	Hillsborough River, Alafia River, Manatee River, Little Manatee River, Tampa Bypass Canal (Palm River)
OFW Waterbodies	Pinellas County Aquatic Preserve Cockroach Bay State Aquatic Preserve Terra Ceia State Aquatic Preserve Hillsborough River State Park Lake Manatee State Recreation Area Little Manatee River
SWIM Waterbodies	Tampa Bay Lake Tarpon Lake Thonotosassa
National Estuary Program	Tampa Bay
Origin of Basin Water	85% flow from tributary rivers, some groundwater discharge to bay
Surface Water Sources of Drinking Water	The Hillsborough River supplies 75% of Tampa's drinking water; the Manatee River supplies drinking water for Manatee County

Hydrogeologic Description

- The principal hydrogeologic units in the Tampa Bay Basin are the surficial aquifer system, the intermediate aquifer system/confining unit, and the Floridan aquifer system.
- The ground water residing in these aquifer systems is under both confined and unconfined conditions.
- The Floridan aquifer system is the primary source of water supply in the area. This includes municipal, industrial, commercial, and agricultural uses.
- Limited water is obtained from the surficial aquifer system and those areas of the intermediate aquifer system that are water bearing units. This water is for agricultural and limited domestic supply uses.
- General flow direction of ground water in the basin is towards Tampa Bay. Other discharge zones include the area rivers and streams, sinks, and lakes.
- Recharge for the Floridan aquifer system comes from those areas of western Polk County where limestones of high permeability are at or near the surface, from direct infiltration by rainfall into sinkholes, by downward leakage from the intermediate aquifer system, and by lateral movement along the hydraulic gradient.

Water Quality Status

- Tampa Bay has been affected by wetland and seagrass destruction and coastline alteration; stormwater pollution from residential and commercial sources; dredging and other port activities; litter; fertilizer, food-processing, and other industrial discharges; and large quantities of domestic wastewater. The bay has extremely high phosphorous levels and is nitrogen limited. Algal blooms and resultant poor water clarity have occurred frequently. Recent trends in water quality show improvement in Hillsborough Bay.
- Despite this improvement, Hillsborough Bay still has the highest concentration of pollution sources in the Tampa Bay system. It has historically had the basin's worst water quality. Some notable

improvement has occurred since the Howard F. Curren wastewater treatment plant converted to advanced wastewater treatment in 1979.

- In the Old Tampa Bay, Sweetwater Creek Sub-basin, Rocky Creek, Alligator Creek, and portions of the Cross Bayou Canal exhibit high nutrient, bacterial, and DO problems. These urban streams have been impaired by habitat alteration, urban runoff and historic wastewater discharge.
- Tampa Bay proper has better water quality than Old Tampa or Hillsborough Bays because it has greater mixing and dilution with the Gulf of Mexico and less concentrated pollution sources. Development is fairly intense along the shoreline, and both domestic and industrial discharges are present.
- Cockroach Bay, on the east side of Tampa Bay, has been downgraded from good to poor water quality. It is affected by septic tanks; the lower part of the bay is impaired by agricultural runoff.
- Because of its close proximity to the Gulf, Terra Ceia Bay has very good water quality. However, increased runoff from development and mangrove cutting threaten the bay.
- The Pinellas County portion of Tampa Bay is an Outstanding Florida Water, and new or expanded discharges will not be allowed to continue.

Of the major tributaries to Tampa Bay

- Dissolved oxygen levels are low in the Hillsborough River except where it flows from the central highlands to the coastal lowlands. Most tributaries are sluggish, blackwater streams that are naturally low in DO. In addition to being in a phosphate rich area, phosphate and nitrate levels generally increase further from both point and nonpoint pollution. Health advisories recommending the limited consumption of largemouth bass have been issued for the Hillsborough River drainage system.
- Major pollution sources in the Alafia River Basin are phosphate mining and processing. Water from Buckhorn and Lithia Springs, which flow into the Alafia, is high in nitrates.
- Generally, the Manatee River has good water quality. The main problem is increased nutrient levels in the Manatee River Reservoir, which has caused algal and weed growth.
- The Little Manatee River has historically had good water quality. While the basin has no major problems, bacteria and nutrient levels are elevated.

Water Quality Trends

- 42 waterbodies were assessed for trends – 57% are improving, 12% are degrading, and 31% are stable.
- Improvements are occurring in the bay system due to decreased nutrients, chlorophyll, and improved water clarity.

Point and Nonpoint Sources of Pollution

Degraded biological communities and water quality in Tampa Bay have been well documented. Intensive residential and industrial development have led to many problems. As a part of the National Estuary Program (NEP), a group of citizens and scientists in the Tampa Bay area participated in a series of meetings to identify and rank the Bay's priority problems. The following list of seven priority problems was formally adopted by the NEP's Policy Committee in 1991:

- Water quality declines/eutrophication, resulting from excess nitrogen in stormwater runoff, direct discharges to the bay, and from atmospheric deposition,
- Declines and impacts to living resources and habitats;
- Increased user conflicts and impacts associated with recreational, commercial, and shipping activity;
- Lack of agency coordination and response;
- Lack of community awareness, noting the specific need for improved boater education, general public outreach, and efforts to make the bay more accessible to residents;
- Circulation and flushing;
- Hazardous/toxic contamination, including sediment contamination and oil/hazardous materials spills.

In addition to habitat destruction, Tampa Bay has also experienced significant point and nonpoint pollution. The following problems were identified in the 1996 305(b) report:

- With the change in land cover from natural vegetation to streets, lawns, and buildings, the quality of runoff decreases while the amount increases. The Hillsborough River receives nutrients and toxins (in sediments) from Tampa's urban runoff.
- Because the bay also serves as a shipping port, it is subject to oil and grease pollution, sewage, and occasional fuel and cargo spills. The port itself, which serves as a loading and unloading facility for fertilizers, pesticides, concrete, and oil, contributes phosphorous and nitrogen.
- The worst water quality problems are found in Hillsborough and MacKay Bays, which receive treated wastewater from the Howard F. Curren advanced wastewater treatment plant, cooling and process water from the TECO Power Company, and several smaller industrial discharges.
- The Alafia River, a particularly significant source of nutrients to the Bay, has extensive phosphate mining and fertilizer operations in its headwaters. Phosphate is processed at the river's mouth.
- Palm River, a tidal river discharging to McKay Bay, has nutrient and DO problems. It receives drainage from heavily urbanized areas that have been extensively ditched, channelized and walled, including the Uceta Yard Drain and the Tampa Bypass Canal. Furthermore, Palm River appears to receive significant nonpoint nutrient loading from fertilizer shipping operations in McKay Bay.

Reference Reports

- Water Quality Assessment for the State of Florida – 305(b) Report (with five technical appendices), Florida Department of Environmental Protection, Bureau of Surface Water Management, 1996
- Tampa Bay Surface Water Improvement and Management Plan, Southwest Florida Water Management District, 1992
- Charting the Course for Tampa Bay, published by the Tampa Bay National Estuary Program in cooperation with the US Environmental Protection Agency, Region IV, 1996

Basin Water Quality Experts

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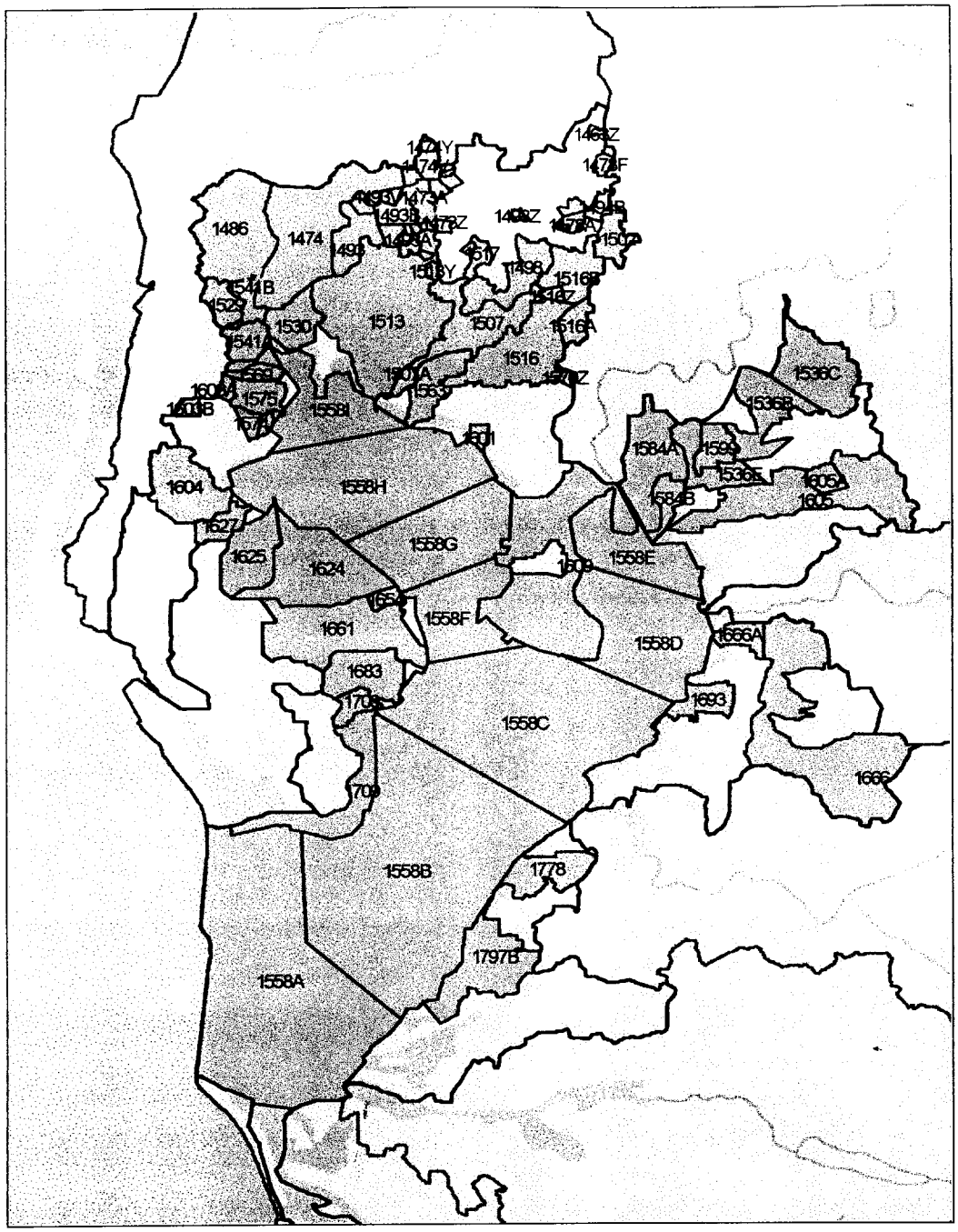
- Dick Eckenrod, Tampa Bay Estuary Program, 727-893-2765



Tampa Bay Basin

Assessed Watershed in the Tampa Bay Basin

Assessed Watersheds in the Tampa Bay Basin[1]

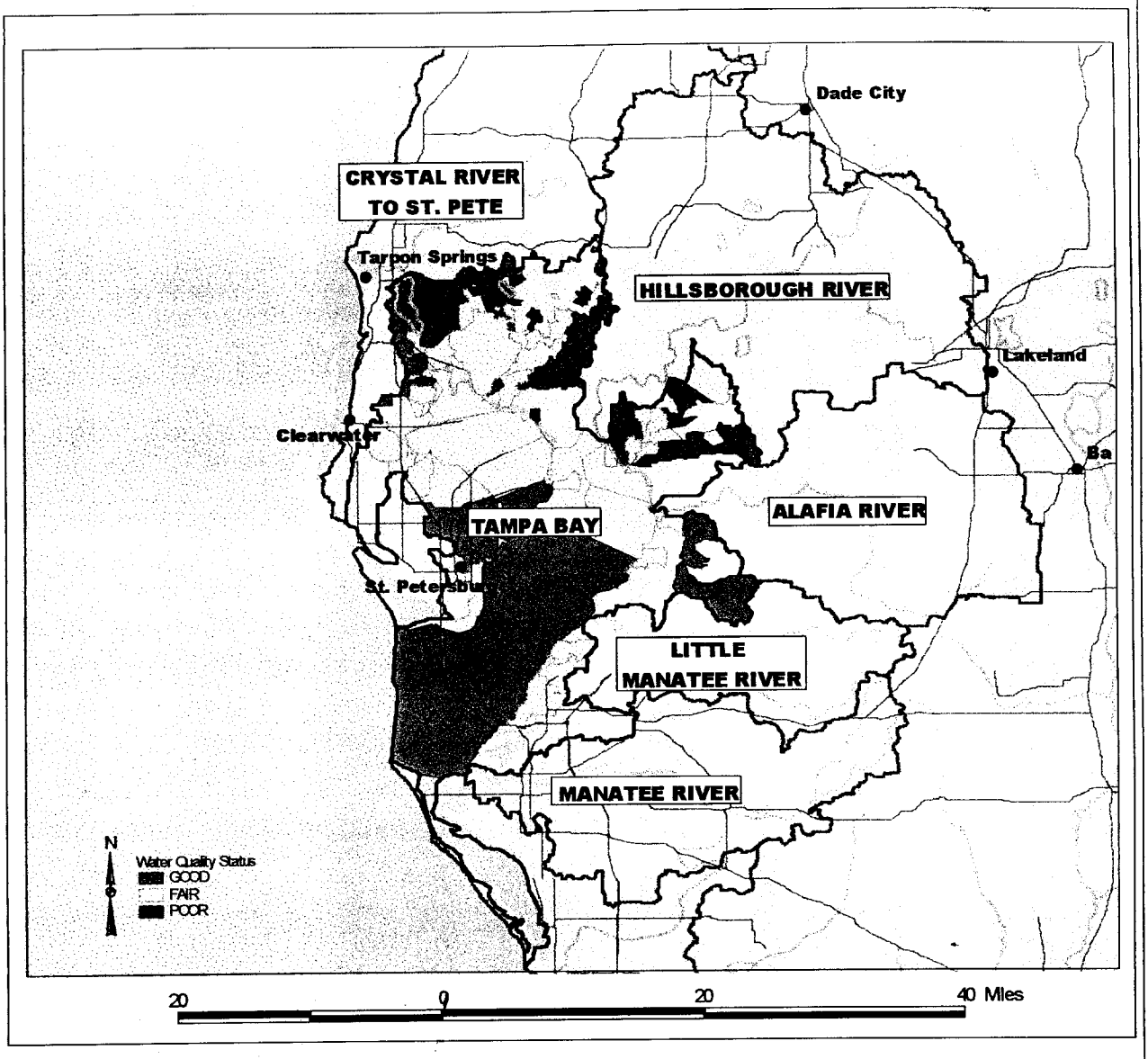
Waterbody ID	Waterbody Type	Waterbody Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
1463Z	Lake	Moss Lake	Good			
1473A	Lake	Keystone Lake	Good	Improving		
1473W	Lake	Lake Juanita	Good	Improving		
1473X	Lake	Mound Lake	Good			
1473Y	Lake	Calm Lake	Good			
1473Z	Lake	James Lake	Good			
1474	Stream	Brooker Creek	Poor	Stable	High	Dissolved Oxygen, Coliforms, Nutrients
1474U	Lake	Island Ford Lake	Good			
1474V	Lake	Crescent	Good	Stable		
1474W	Lake	Dead Lady Lake	Fair	Degrading		
1474X	Lake	Wood Lake	Good			
1474Y	Lake	Lake Oseola	Good			
1474Z	Lake	Holiday Lake	Good			
1478A	Lake	Saddleback Lake	Good			
1478C	Lake	Lake Crenshaw	Good	Improving		
1478F	Lake	Lake Hobbs	Good			
1478X	Lake	Snake Lake	Good			
1478Z	Lake	Deer Lake	Good			
1486	Lake	Lake Tarpon	Good	Stable		
1493	Lake	Buck Lake	Fair			
1493A	Lake	Church Lake	Good	Improving		
1493B	Lake	Lake Alice	Good			
1493V	Lake	Taylor Lake	Good			
1493W	Lake	Garden Lake	Good	Improving		
1493X	Lake	Rainbow Lake	Good			
1493Y	Lake	Moon Lake	Good			
1494B	Lake	Brant Lake	Fair	Degrading		
1496	Lake	Sunset Lake	Good			
1498	Stream	Brushy Creek	Fair		Low	Dissolved Oxygen, Coliforms
1498Z	Lake	Dosson Lake	Fair			
1502	Lake	Chapman Lake Outlet	Good			
1507	Stream	Rocky Creek	Fair	Stable	High	Dissolved Oxygen, Coliforms, Nutrients, Total Suspended Solids
1507A	Estuary	Rocky Creek	Poor	Stable	High	Dissolved Oxygen, Coliforms, Nutrients
1513	Estuary	Double Branch	Fair	Improving	Low	Dissolved Oxygen, Coliforms, Nutrients
1513	Estuary	Double Branch	Fair	Improving	Low	Dissolved Oxygen, Coliforms, Nutrients

[1] The table identifies the watersheds (by name, waterbody type, and ID Number) in the Lower Suwannee River Basin that were assessed in 1998. Water Quality determinations for status and trend have been provided for each watershed. Watersheds with TMDL waterbodies are listed and the 1998 priority provided.

Waterbody ID	Waterbody Type	Waterbody Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
1513Y	Lake	Lake Maurine	Good			
1513Z	Lake	Lake Grace	Good			
1516	Stream	Sweetwater Creek	Good	Improving	Low	Dissolved Oxygen, Coliforms
1516A	Lake	Lake Carroll	Good			
1516B	Lake	Lake Madelene	Good	Improving		
1516Z	Lake	Wilson Lake	Good			
1517	Stream	Halfmoon Lake Drain	Good			
1519Z	Lake	Armistead Lake	Good	Degrading		
1529	Stream	Cow Branch	Good			
1530	Estuary	Moccasin Creek	Fair		Low	Dissolved Oxygen, Coliforms, Nutrients
1536B	Stream	Sixmile Creek	Good	Stable	Low	Dissolved Oxygen, Coliforms, Nutrients, Turbidity, Biochemical Oxygen Demand
1536C	Stream	Tampa Bypass Canal	Fair	Degrading	Low	Dissolved Oxygen, Nutrients
1536E	Estuary	Palm River	Fair	Improving	Low	Dissolved Oxygen, Coliforms, Nutrients
1541A	Stream	Lake Tarpon Canal	Good	Stable	Low	Dissolved Oxygen, Coliforms, Nutrients
1541B	Stream	Lake Tarpon Canal	Fair	Stable	Low	Dissolved Oxygen
1558A	Estuary	Tampa Bay Lower	Good	Stable		
1558B	Estuary	Tampa Bay Mid	Good	Stable		
1558C	Estuary	Tampa Bay Upper	Good	Improving	Low	Coliforms, Mercury (Based on Fish Consumption Advisory)
1558D	Estuary	Hillsborough Bay Lower	Fair	Improving	Low	Dissolved Oxygen, Mercury (Based on Fish Consumption Advisory)
1558E	Estuary	Hillsborough Bay Upper	Fair	Improving	High	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
1558F	Estuary	Old Tampa Bay Lower	Good	Improving	Low	Coliforms, Mercury (Based on Fish Consumption Advisory)
1558G	Estuary	Old Tampa Bay	Fair	Improving	Low	Coliforms, Mercury (Based on Fish Consumption Advisory)
1558H	Estuary	Old Tampa Bay	Fair	Improving	High	Coliforms, Nutrients, Mercury (Based on Fish Consumption Advisory)
1558I	Estuary	Old Tampa Bay	Fair	Improving	High	Coliforms, Nutrients, Mercury (Based on Fish Consumption Advisory)

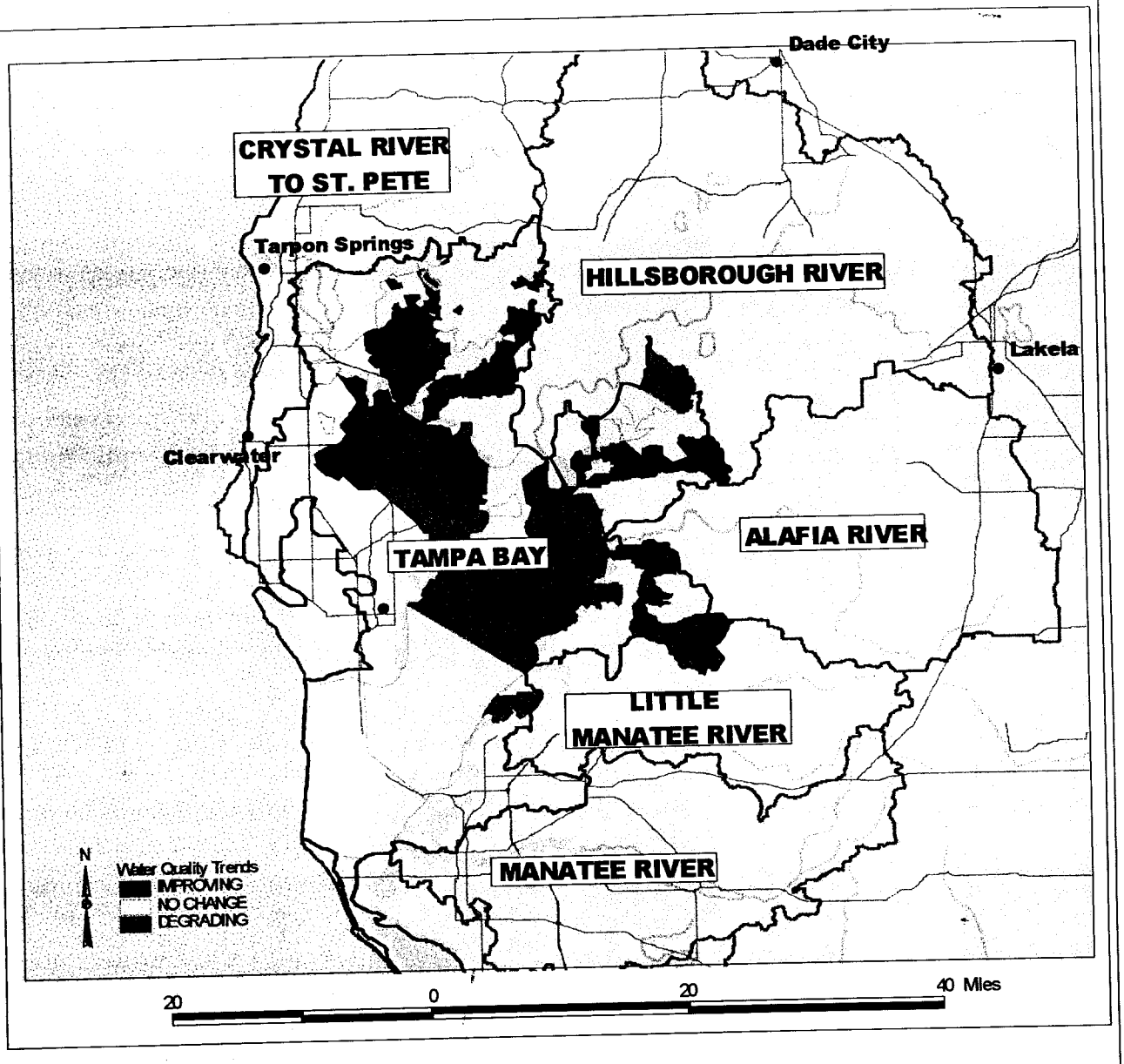
Waterbody ID	Waterbody Type	Waterbody Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
1559	Estuary	Direct Runoff To Bay	Fair		High	Dissolved Oxygen, Coliforms, Nutrients
1563	Estuary	Channel G	Fair	Improving	Low	Dissolved Oxygen, Coliforms, Nutrients
1569	Estuary	Bishop Creek	Good		Low	Dissolved Oxygen, Coliforms, Nutrients
1570Z	Lake	Egypt Lake	Good			
1574	Stream	Alligator Creek	Fair	Stable	Low	Nutrients, Dissolved Oxygen, Coliforms
1574A	Estuary	Alligator Lake	Fair		Low	Dissolved Oxygen, Coliforms, Nutrients
1575	Estuary	Mullet Creek	Fair		Low	Dissolved Oxygen, Coliforms, Nutrients
1584A	Stream	Ybor City Drain	Poor		High	Nutrients, Total Suspended Solids, Biochemical Oxygen Demand, Chemical Oxygen Demand
1584B	Estuary	Mckay Bay	Fair	Improving	High	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
1599	Estuary	Uceta Yard Drain	Fair	Stable	High	Nutrients
1601	Estuary	Direct Runoff To Bay	Poor	Degrading	High	Dissolved Oxygen, Coliforms, Nutrients
1603A	Lake	Lake Chautauqua	Good			
1603B	Lake	Harbor Lake	Good			
1604	Estuary	Allen Creek	Fair		Low	Dissolved Oxygen, Coliforms, Nutrients
1605	Stream	Delaney Creek	Poor	Improving	High	Dissolved Oxygen, Coliforms, Lead, Nutrients, Turbidity, Biochemical Oxygen Demand
1605A	Lake	Lake Tenmile	Fair			
1609	Estuary	Direct Runoff To Bay	Fair	Stable	High	Dissolved Oxygen, Coliforms, Nutrients
1624	Estuary	Direct Runoff To Bay	Fair		High	Dissolved Oxygen, Coliforms, Un-ionized Ammonia, Nutrients
1625	Estuary	Cross Canal (North)	Fair		Low	Dissolved Oxygen, Coliforms, Nutrients
1627	Stream	Long Branch	Fair		High	Dissolved Oxygen, Coliforms, Nutrients
1654	Estuary	Snug Harbor	Good		Low	Dissolved Oxygen
1661	Lake	Sawgrass Lake	Good			
1666	Stream	Bullfrog Creek	Good	Improving		

Waterbody ID	Waterbody Type	Waterbody Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
1666A	Estuary	Bullfrog Creek	Fair	Improving	Low	Dissolved Oxygen, Coliforms, Nutrients
1683	Estuary	Smacks Bayou	Good		Low	Dissolved Oxygen, Coliforms, Nutrients
1693	Estuary	Big Bend Bayou	Fair	Improving		
1700	Estuary	Coffeepot Bayou	Good		Low	Dissolved Oxygen, Coliforms, Nutrients
1709	Estuary	Big Bayou	Fair		High	Dissolved Oxygen, Coliforms, Nutrients
1778	Estuary	Cockroach Bay	Fair	Improving	Low	Dissolved Oxygen, Coliforms, Nutrients, Mercury (Based on Fish Consumption Advisory)
1797B	Estuary	Bishops Harbor	Fair		Low	Nutrients, Mercury (Based on Fish Consumption Advisory)



Water Quality - Status
Tampa Bay Basin
HUC Number 03100206
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauxe
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section



Water Quality - Trends
Tampa Bay Basin
HUC Number 03100206
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauss;
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section

Lower Suwannee River Basin

Water Quality Summary

The Suwannee River is Florida's second largest river in terms of discharge and is an Outstanding Florida Water. While the river basin has excellent overall surface water quality, ranking in the top 20% of Florida's 52 river basins (1998 305(b) unpublished report), groundwater quality in the basin has been decreasing and may impact surface water quality.

Surface and groundwater are connected through many springs. During high Suwannee River flow, river water moves into the Floridan aquifer, and during low flow, Floridan water moves into the river. The exposed nature of the aquifer (with little material between the land surface and the aquifer to filter contaminates) makes it susceptible to contamination from dairies, poultry farms and other high-intensity agricultural operations.

The poorest water quality in the area is caused by high nitrates in the groundwater that are released to the river through springs and seeps. Water from some wells in the area exceed the drinking water standard for nitrate of 10 mg/l. Agriculture affected wells have nitrate concentrations up to 75 times higher than background wells, and the affected wells have increased in nitrate concentrations by 40% in the last 7 years. Nitrate levels in the lower Suwannee river have increased from 0.2 to 0.8 mg/l over the last 30 years, and water from some springs above the Branford area have nitrate levels from 3.0 to 8.0 mg/l.

A compounding problem is high phosphorus concentrations in the Suwannee river that are caused by mining and fertilizer operations 50 miles upstream in the Swift creek and adjacent tributaries. Exceedingly high levels of phosphorus in Swift Creek (20 mg/l) in the 1970's have been reduced to below 5 mg/l in the last few years. The phosphorus levels in the Suwannee River reflect the same increasing/decreasing trend as Swift Creek.

The high phosphorus levels and increasing nitrate levels have affected the algal growth in the river recently with increased algal biomass (SRWMD, 1997). Fortunately, the naturally dark water that characterizes the Suwannee limits algal growth during high flow. However, during low flow, the river is much clearer due to the spring water inflows. Algal growth potentials in the estuary may be increasing due to the increased nutrients (the estuary has much clearer water than the river).

The Suwannee River Water Management District (SRWMD) has estimated the relative contribution of nitrogen loading by source throughout the Suwannee River Basin (including the Lower Suwannee River Basin) to be as follows: 20% dairy, 20% poultry, 50% fertilizer, 2% human, and 7% atmosphere.

According to the 1998 303(d) list, the Lower Suwannee River Basin contains two segments that require TMDLs. These segments include the river and Alan Mill Pond, a tributary to the river. The parameters of concern are dissolved oxygen, nutrients, and mercury in fish.

The Suwannee River Basin Nutrient Management Working Group was formed in 1997 in response to increased awareness of nitrate concentration in groundwater, springs, and drinking water wells in the basin. The group, consisting of representatives from several agencies (DEP, DACS, the SRWMD, Department of Health, and DCA) is working with researchers, the private sector, and citizens in the basin to focus resources on nutrient issues. The group plans to use technical assistance, research, and educational programs, in combination with incentives and other non-regulatory tools to address water quality issues.

Basin Description

The Suwannee River originates in the Okefenokee Swamp of South Georgia, and flows for 280 miles to the Gulf of Mexico. From the Okefenokee Swamp, the Suwannee flows southward to White Springs, then westward for about 25 miles. The Lower Suwannee Basin begins at the junction of the Withlacoochee River, where the course of the Suwannee turns to flow southward toward the Gulf again. The Lower Suwannee has one major tributary -- the Santa Fe River-- but also receives large quantities of ground water from the Floridan aquifer system by springs and seepage through the river bottom. The Suwannee River enters the Gulf of Mexico at the town of Suwannee, near Cedar Key.

A summary of key basin characteristics include:

Drainage area	1,596 square miles
Major land uses	Forestry, agriculture (row crops, cattle, dairy, poultry)
Population density	Low
Major Cities	Live Oak, Branford, Chiefland
Major Counties	Columbia, Dixie, Gilchrist, Lafayette, Levy, Madison, Suwannee, and Taylor
Major Tributaries	Santa Fe River
OFW Waterbodies	Suwannee River, Lower Suwannee National Wildlife Refuge
SWIM Waterbodies	Suwannee River System
Origin of Basin Water	The Suwannee River originates in the Okefenokee Swamp of South Georgia, and flows for 280 miles to the Gulf of Mexico.

Hydrogeologic Description

- The Floridan aquifer system is the main source of water supply in the Lower Suwannee River Basin.
- The top of the Floridan aquifer system is close to the land surface in the Lower Suwannee River Basin. The aquifer is unconfined to semi-confined and there is a high recharge potential in most of the basin (FGS, 1991). This means that rainfall and surface runoff tends to move directly into the aquifer, with little or no material between the land surface and the top of the Floridan aquifer system to filter and remove contaminants.
- There is a high degree of interaction between surface water and ground water in the lower Suwannee River Basin.
- The area's porous karst terrain accounts for numerous springs.
- When the river level is low, large amounts of the water in the lower Suwannee River are derived from ground water from the Floridan aquifer system. The USGS (1998) analyzed flow in the 33-mile stretch of the Suwannee River between Dowling Park and Branford, a stretch of the river with no surface water inflow. River discharge increased by 950 cubic feet per second, with inflow from measured springs accounting for 40 percent of the flow and inflow from seeps and unnamed springs accounting for 60 percent of the flow.
- When the river level is high, flow reverses and water from the river flows into springs and seeps. Water moves laterally from the river into the Floridan aquifer system, slowing and redirecting regional ground water flow.
- Because of the land's rapid drainage, dairies and other high-intensity agricultural operations can degrade groundwater. To monitor groundwater pollution, FDEP and the Suwannee River Water Management District sample a network of wells.
- Below Fanning Springs, the river passes into the lower coastal areas, which are primarily forested swamps where silviculture is the major land use. The town of Suwannee lies next to the estuary. Manatees are found in the lower reaches of the Suwannee River.

Water Quality Status

- Elevated nitrate levels have been measured in Floridan aquifer system wells, in the Suwannee River, and in water from springs in the Lower Suwannee River Basin. Nitrate

levels exceeding the primary drinking water standard of 10 mg/l have been detected in private potable wells.

- The Ambient Monitoring Program maintains a VISA network covering a 28 square mile area adjacent to the Suwannee River in north central Lafayette County. This network is designed to study the effects of agricultural land use on ground water. Data collected from the VISA wells in 1990, 1991, and 1994 were compared to data from background wells collected at the same time. Median nitrate values in the VISA area were found each year to exceed median values in the background wells.

Network	1990	1991	1994	1997
VISA	1.520	0.130	1.900	2.200
Background	0.020	0.075	0.020	not available

Source: Ambient Newsletter, January 1998, Volume 2, No. 1.

- The USGS (1998) measured nitrate concentrations in eleven springs along the Suwannee River between Dowling Park and Branford. Values ranged from 1.3 mg/l to 8.2 mg/l; the median concentration was 1.7 mg/l. Background nitrate concentration in springs up river was 0.05 mg/l.
- The Suwannee River Water Management District (SRWMD) found that nitrate-nitrogen concentrations measured in the Suwannee River were much lower during high flow conditions when most of the water in the river is derived from surface runoff than during low flow conditions when large amounts of ground water enter the river (SRWMD, 1997).
- Of particular interest is the section of river between Luraville and Branford. The highest nitrate-nitrogen values in the river were measured at Branford. There are no significant contributions of surface water between Luraville and Branford, yet nitrate-nitrogen values doubled in this stretch of the river. The SRWMD (1997) concluded that the major source of nitrate-nitrogen in the Suwannee River during low flow conditions is ground water.
- Biological sampling conducted by the SRWMD indicates an increase in mean algal biomass at Luraville and Branford. A biological response to the increasing nitrate-nitrogen concentrations appears to be occurring, indicating that the increased nutrient concentrations are having an ecological effect (SRWMD, 1997).

Water Quality Trends

- The lower Suwannee River stream segment (segment 3422A) is showing an improving trend due to an improvement in BOD, total coliform, and total phosphorus levels.
- Stream segments 3422, 3422B and 3733 (water body ID) indicate no change in their overall water quality.

Point and Nonpoint Sources of Pollution

- Mining operations in the upper basin contribute phosphorus to the river. Over the past decade, however, total phosphorus levels have declined.
- Gold Kist, a poultry-processing plant, discharges below the confluence of the Withlacoochee.
- In the Withlacoochee Basin, several wastewater treatment plants discharge to the Withlacoochee River in Georgia, and a Georgia pulp mill delivers effluent through Jumping Gully Creek. The river also receives considerable quantities of sediments and nutrients—and some pesticides—from agricultural runoff.
- According to USGS (1998), possible sources of nitrate in the vicinity of the river include fertilizer, animal wastes from dairy and poultry operations, and septic tank effluent.

Reference Reports

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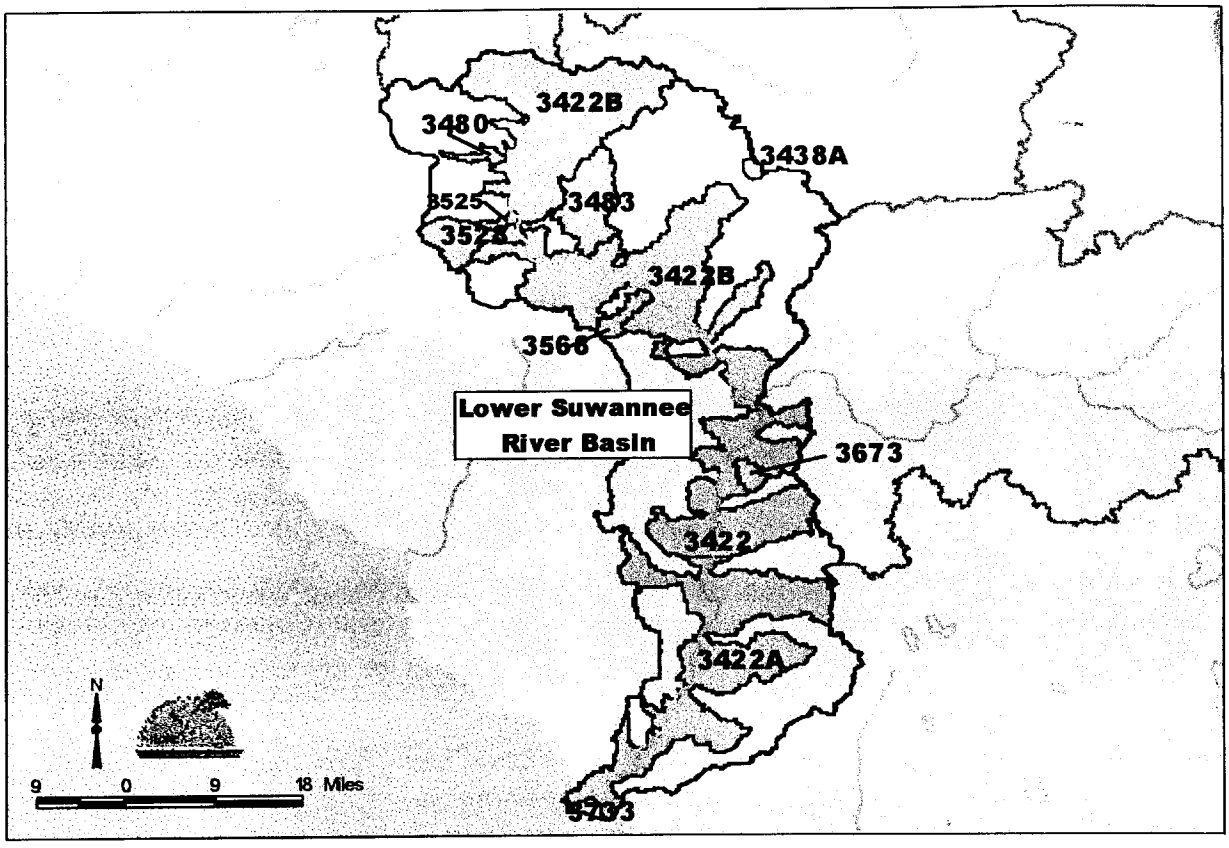
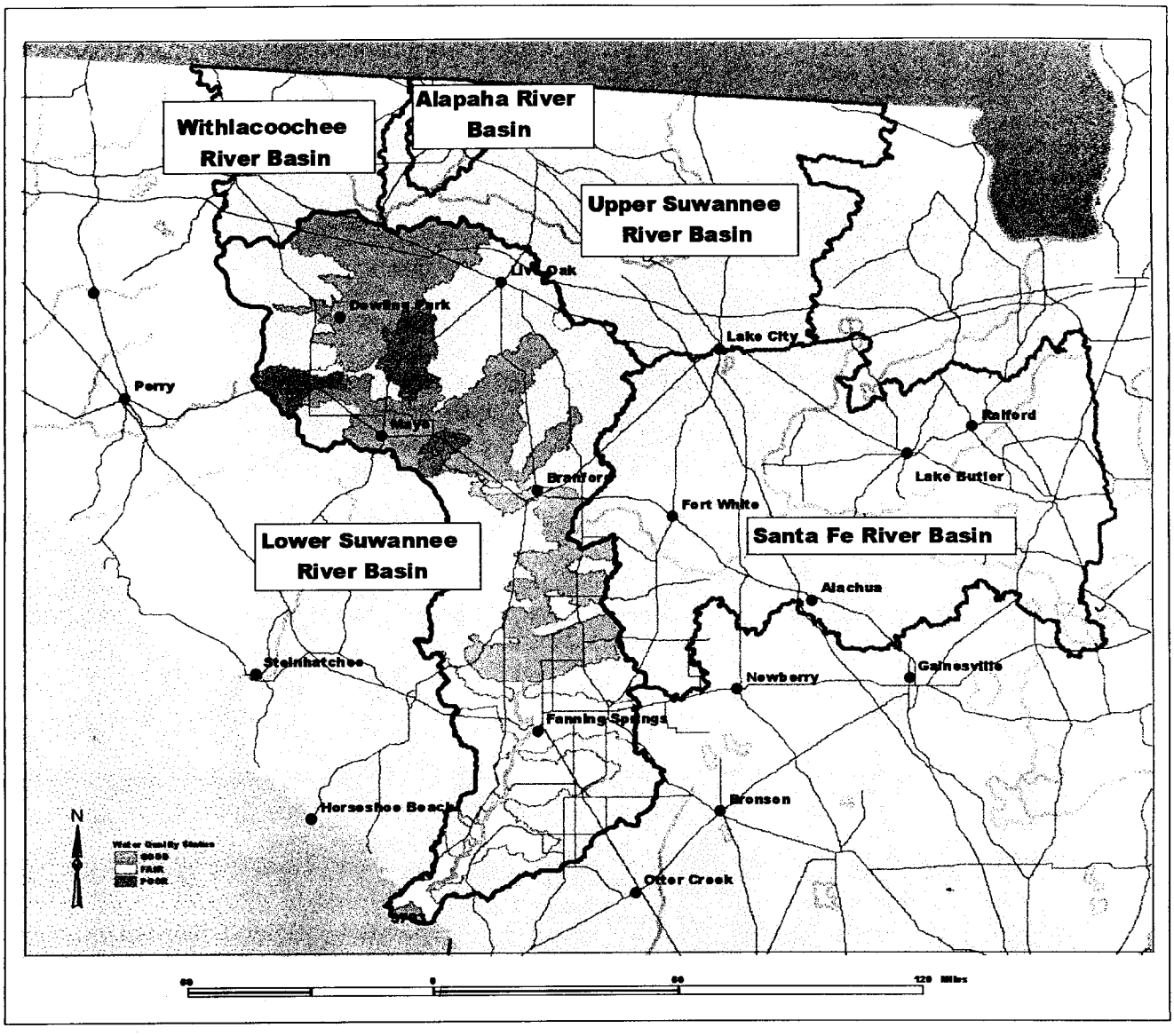


Assessed Watersheds in the Lower Suwannee River Basin[1]

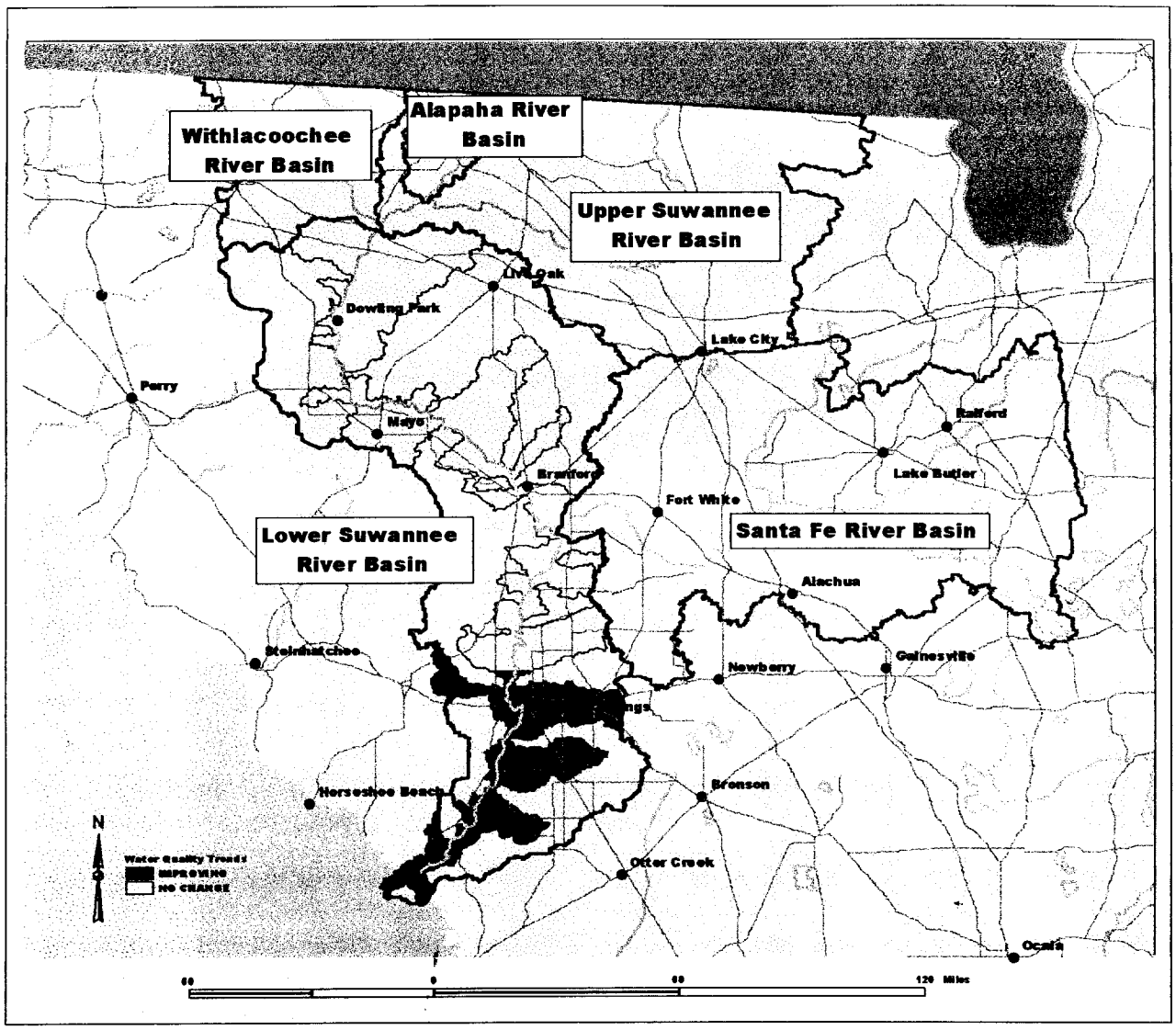
Waterbody ID	Waterbody Type	Watershed Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
3525	Spring	Allen Mill Pond	Fair		Low	Dissolved Oxygen, Nutrients
3480	Stream	Bethel Creek	Good			
3528	Spring	Blue Spring	Poor			
3422V	Spring	Convict Spring	Poor			
3733	Stream	Direct Runoff To Gulf	Good	Stable		
3568	Spring	Owens Spring	Poor			
3483	Spring	Peacock Slough	Poor			
3673	Spring	Rock Bluff Spring	Fair			
3422U	Spring	Royal Spring	Poor			
3422W	Spring	Running Spring	Poor			
3422	Stream	Suwannee River (Lower)	Good	Stable		
3422B	Stream	Suwannee River (Lower)	Good	Stable	Low	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
3422A	Stream	Suwannee River (Lower)	Fair	Improving		
3422X	Spring	Telford Spring	Poor			
3422T	Spring	Troy Spring	Poor			

[1] The table identifies the watersheds (by name, waterbody type, and ID Number) in the Lower Suwannee River Basin that were assessed in 1998. Water Quality determinations for status and trend have been provided for each watershed. Watersheds with TMDL waterbodies are listed and the 1998 priority provided.



Water Quality - Status
Lower Suwannee River Basin
HUC Number 03110205
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauxe
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section



Water Quality - Trends
Lower Suwannee River Basin
HUC Number 03110205
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauxe;
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section

Lower St. Johns River Basin

Water Quality Summary

The southern portion of the Lower St. Johns River Basin exhibits a wide range in water quality. Except for Lower Rice Creek, a tributary system with poor water quality from a point source, most pollution in the southern portion of the river comes from runoff from rangelands, agriculture, and construction (305[b] Report, 1996). The northern, (Duval County) portion of the basin also has a mixture of water quality (good, fair, and poor), although it does improve near the mouth due to the flushing effect of tides. Many tributary systems in this area are also seriously degraded. Both domestic and industrial point sources, as well as urban stormwater and septic tanks, are major contributors of pollution (305[b] Report, 1996).

Trend data for the basin generally indicates most assessed waterbodies are remaining stable. With 55 waterbodies assessed for trends – 13% are improving, 13% are degrading, and 74% are stable. Both the upper portion of the basin in Dunn's Creek and the St. John's River 25 miles downstream of Dunn's Creek are showing a degrading trend. Nitrogen is increasing causing a trophic state degradation in the wide river. Improvement is occuring at 3 of the mainstream St. Johns River segments towards the mouth of the St. Johns River, in the Duval County area.

According to the 1998 303(d) list, there are 53 segments in the Lower St. Johns River Basin that do not fully meet designated uses. This includes tributaries to the St. Johns River as well as portions of the River. Dissolved oxygen, nutrients, and coliforms are parameters of concern in many of the segments. Various metals, total suspended solids, biochemical oxygen demand, and turbidity were identified as parameters of concern in some of the segments.

In December, 1997 the Mayor of Jacksonville held a one day summit on the health of the Lower St. Johns River. As part of the summit, a report titled "Health of the River – A Survey of the Factors Affecting Water Quality in the Lower St. Johns River Basin" was distributed to attendees. At the summit, a restoration plan for the Lower St. Johns River Basin was presented that outlined the first five years and a proposed budget of 54 million dollars. The restoration plan focused on four areas: reduce pollution from urban and surburan areas, rehabilitate degraded aquatic habitats, reduce pollution from farming areas, and prepare for the next five years. During the 1998 session, the Florida Legislature appropriated the first year's funding request of 10.5 million dollars. Funds from the first year are directed toward nutrient reductions from point sources, reuse from point sources, water quality enhancements to several stormwater projects, cost share for agricultural BMP's, and ongoing water quality studies.

Basin Description

The St. Johns River, Florida's longest river (300 miles), flows northward from its origins west of Ft. Pierce, emerging at the Atlantic Ocean near Jacksonville. It moves very slowly, dropping less than 30 feet in elevation over its entire length. The Lower St. Johns, the section between the Oklawaha River confluence and the Atlantic Ocean, is essentially an elongated lagoon, with a low gradient and a narrow floodplain. The river averages more than two miles wide downstream of Palatka (in some places more than three miles) and contains numerous tributary streams and embayments.

A summary of key basin characteristics include:

Drainage Area	about 2,200 square miles
Major Land Uses	forestry, agriculture, rapid transition to urban, intense urbanization in downstream area
Population Density	moderate, except in highly urban Jacksonville area
Major Cities	Jacksonville, Palatka, Green Cove Springs, Orange Park
Major Counties	Duval, Clay, St. Johns, Putnam, Flagler, Volusia
Major Tributaries	Oklawaha River (principal tributary) and 13 major sub-basins
Other Tributary Systems	Haw Creek/Crescent Lake/Dunns Creek, Rice Creek, Simms Creek, Boggy Branch, Greens Creek, Clarks Creek, Trout Creek, Black Creek/Peters Creek, Jullington Creek, Durbin Creek, and Doctors Lake
OFW Waterbodies	Haw Creek State Preserve Mike Roess Gold Head Branch State Park Nassau River-St. John Marshes Aquatic Preserve Kingley Lake and North Fork of Black Creek (upper) Ravine Gardens
SWIM Waterbodies	entire basin, including Crescent Lake and Lake Diston sub-basin
Origin of Basin Water	Upper St. Johns River and the 12 sub-basins listed in descending order of size: Crescent Lake, Etonia Creek, Black Creek, Ortega River, Trout River, Broward River, Dunn Creek, Arlington River, Julington Creek, Six Mile Creek, McCullough Creek, and Deep Creek

Hydrogeologic Description

- The limited gradient of the St. Johns River, combined with low flows, tides, and wind direction result in short term reverse tidal flows. Although these conditions may continue for several days, the river has a net downstream flow 75 percent of the time.
- The tributary systems entering the St. Johns are generally blackwater in nature, draining mostly low pinelands.
- The principal hydrogeologic units in the Lower St. Johns River Basin are the surficial aquifer, intermediate aquifer system and upper confining unit, and the Floridan aquifer system. Of these, the Floridan aquifer is the primary source of water for public supply. The Floridan aquifer is also important as a water source for agricultural, industrial / commercial, recreational, and domestic self-supply uses (305[b] Report,1996).
- Overall direction of flow for ground water in the Lower St. Johns River Basin is to the east. In general discharge from the Floridan occurs in areas along the St. Johns and Oklawaha Rivers, and along the Atlantic coast. Artesian flow occurs near the St. Johns River proper (305[b] Report, 1996).
- In the Lower St. Johns River Basin, recharge to the Floridan aquifer system occurs from downward leakage of water from the overlying surficial and intermediate aquifer systems, and through direct recharge from rainfall. The areas with the highest recharge rates are those portions of Putnam and Clay Counties where the limestones of the aquifer system are at or near the surface (305[b] Report, 1996).
- In portions of St. Johns and Flagler counties, the Floridan aquifer system contains nonpotable water or is too deep for affordable use (305[b] Report, 1996). In these areas, the surficial and intermediate aquifer systems are a source of public water supply.
- High ground water withdrawals from the Floridan aquifer are a major concern in the basin. A decline in ground water elevations means a decline in normal base flow rates to the regions surface waters. (SWIM Plan, 1993)

Water Quality Status

- According to the 1996 Florida Water Quality Assessment (305[b] Report, 1996), water quality in the southern portion of the Lower St. Johns is good, especially at its confluence with the Oklawaha River. Many of the tributary systems, however, have water quality problems.
- In 1986 the Florida Department of Environmental Protection made recommendations for controlling domestic and industrial effluents and stormwater runoff in the Lower St. Johns. That report and others indicated that the tributaries, particularly their sediments, were more heavily polluted than the river itself (305[b] Report, 1996).
- Except for Lower Rice Creek, a tributary system with poor water quality from a point source, most pollution comes from runoff from rangelands, agriculture, and construction (305[b] Report, 1996).
- The Duval County portion of the basin generally has a mixture of water quality (good, fair, and poor), although it does improve near the mouth from flushing effects of tides. Many tributary systems in this area are seriously degraded. Both domestic and industrial point sources, as well as urban stormwater and septic tanks, are major contributors of pollution (305[b] Report, 1996).

Water Quality Trends

- 55 waterbodies were assessed for trends – 13% are improving, 13% are degrading, and 74% are stable.
- Degradation is occurring in the upper portion of the basin in Dunn's Creek and the St. John's River 25 miles downstream of Dunn's Creek. Nitrogen is increasing, causing a trophic state in the wide portion of the river which functions more like a lake biologically.
- Improvement is occuring at 3 of the mainstream St. Johns River segments in the Duval County area.

Point and Nonpoint Sources of Pollution

- Most of the tributary systems to the Lower St. Johns River have water quality problems. Many of these problems stem from point and nonpoint sources of industrial/commercial, agricultural, and municipal causes. Other problems, for example low DO content in black water streams, are naturally occurring phenomena.
- The Haw Creek/Crescent Lake/Dunns Creek area receives loading from agricultural runoff, septic tanks and treated wastewater effluent. Point sources include the Crescent City wastewater plant and the City of Bunnell treatment facility (305[b] Report, 1996).
- Animal wastes from dairy farms and effluent from the Georgia-Pacific paper mill in Rice Creek have been linked to low species diversity in the biological communities in the creek (305[b] Report, 1996).
- Simms Creek, Boggy Branch, Greens Creek, and Clarkes Creek have sporadic turbidity problems because of spills from upstream titanium mining (305[b] Report, 1996).
- Nonpoint source pollution stemming from urban development threatens water quality in Trout Creek, the Black Creek/Peters Creek tributary system, the Jullington Creek and Durbin Creek tributary systems, and Doctors Lake (305[b] Report, 1996).
- Two other major pollution sources are Jacksonville's regional wastewater treatment facility (the Buckman Street plant) and Jefferson Smurfit (formerly Alton Box and Packaging Corporation).

Reference Reports

- Summary of Groundwater Quality in the St. Johns River Water Management District 1990-1994.
- Water Quality Assessment for the State of Florida – 305(b) Report (with five technical appendices), Florida Department of Environmental Protection, Bureau of Surface Water Management, 1996
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- Lower St. Johns River Basin SWIM Plan, St. Johns river water Management District, 1993

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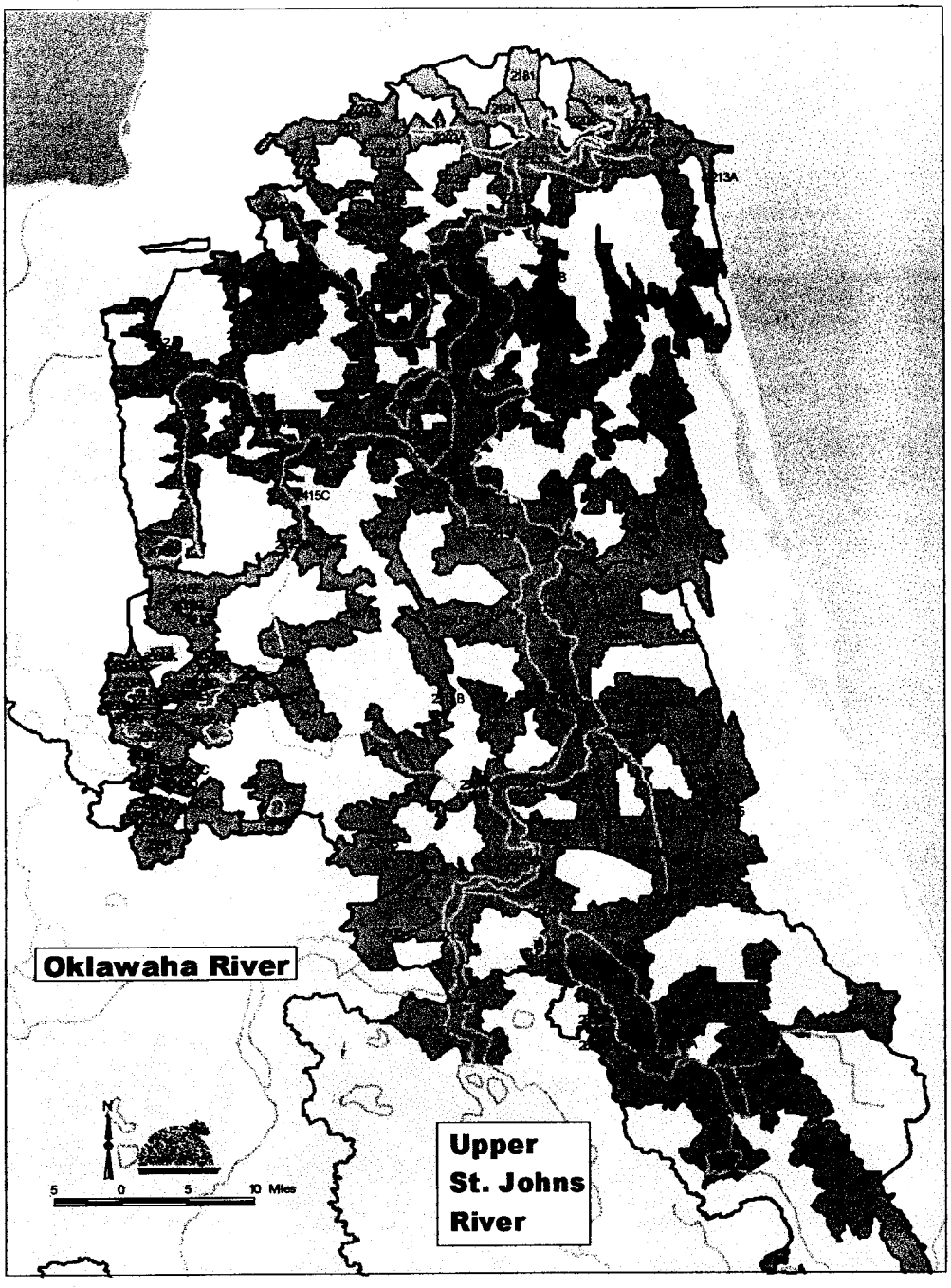


Lower St. Johns River Basin

Assessed Watersheds in the Lower St. John River Basin

Assessed Watersheds in the Lower St. Johns River Basin[1]

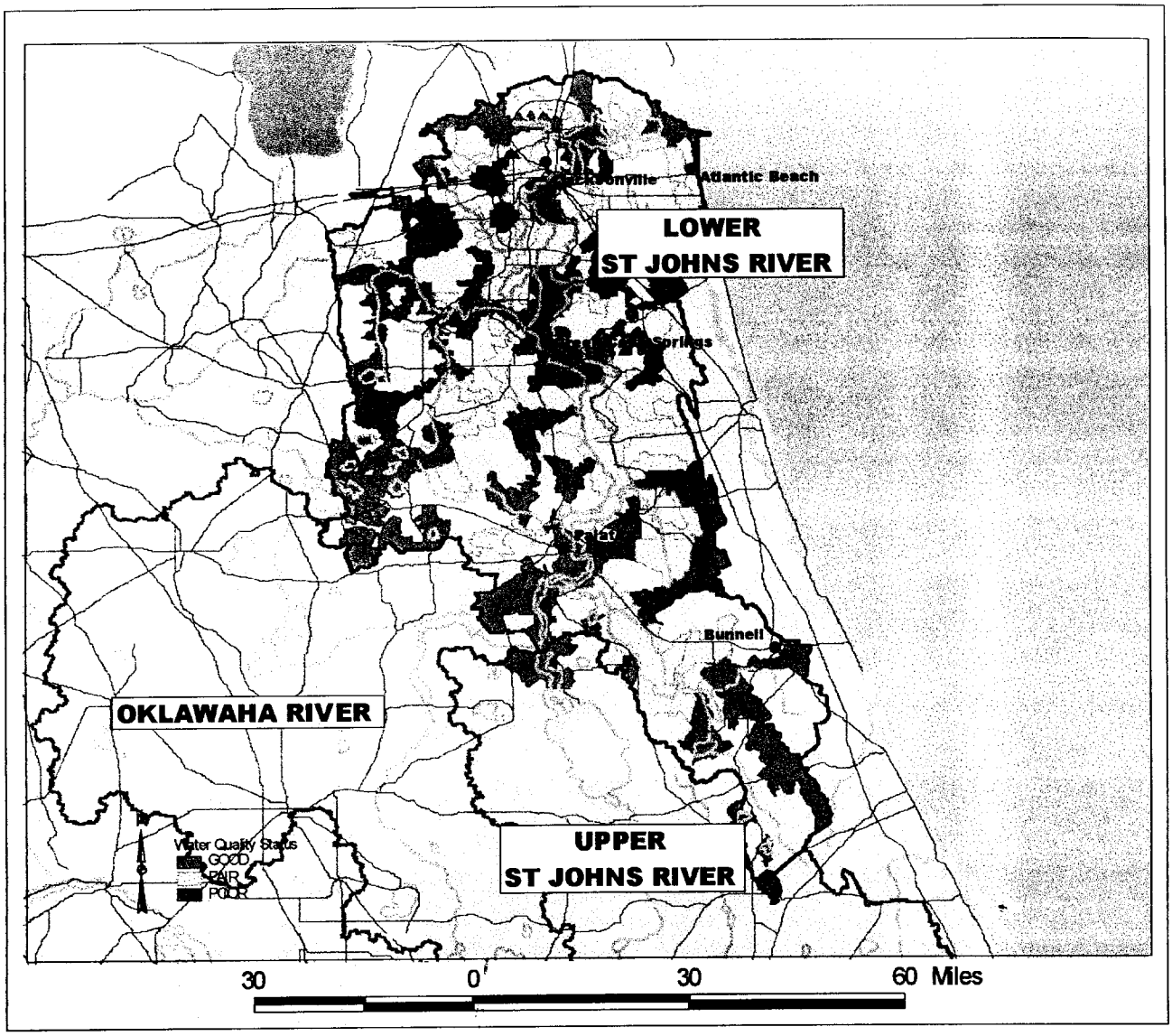
Waterbody ID	Waterbody Type	Waterbody Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
2181	Stream	Dunn Creek	Good			
2188	Estuary	Clapboard Creek	Fair			
2191	Estuary	Broward River	Fair	Stable		
2203	Stream	Trout River	Poor		Low	Dissolved Oxygen, Coliforms, Iron
2203A	Estuary	Trout River	Good	Stable	Low	Nutrients, Coliforms, Cadmium
2205A	Estuary	Sisters Creek	Good			
2205B	Estuary	Cedar Point Creek	Poor		Low	Nutrients, Iron
2205C	Estuary	Icww	Fair	Degrading	Low	Dissolved Oxygen, Coliforms
2206	Stream	Little Trout River	Poor		High	Nutrients, Total Suspended Solids
2209	Estuary	Browns Creek	Fair			
2213A	Stream	Stj Riv Ab Mouth	Good	Stable	Low	Fluoride, Total Suspended Solids
2213B	Stream	Stj Riv Ab Icww	Fair	Improving	High	Coliforms, Turbidity, Total Suspended Solids
2213C	Stream	Stj Riv Ab Dames Pt	Good	Stable	High	Nutrients, Turbidity, Total Suspended Solids
2213D	Stream	Stj Riv Ab Trout Riv	Good	Improving	High	Coliforms, Nutrients, Turbidity, Total Suspended Solids
2213E	Estuary	Stj Riv Ab Warren Brg	Good	Stable	High	Coliforms, Nutrients
2213F	Estuary	Stj Riv Ab Piney Pt	Fair	Improving	High	Coliforms, Mercury, Nutrients
2213G	Lake	Stj Riv Ab Doctor Lake	Good	Stable	High	Iron, Nutrients
2213H	Lake	Stj Riv Ab Julington C	Good	Stable		
2213I	Lake	Stj Riv Ab Black Ck	Good	Stable		
2213J	Lake	Stj Riv Ab Palmo Ck	Fair	Stable		
2213K	Lake	Stj Riv Ab Tocio	Fair	Degrading	High	Lead, Copper, Silver, Nutrients
2213L	Lake	Stj Riv Ab Federal Pt	Fair	Degrading	High	Lead, Cadmium, Copper, Silver, Nutrients
2213M	Stream	Stj Riv Ab Rice Ck	Good	Degrading		
2213N	Stream	Stj Riv Ab Dunns Ck	Good	Stable		
2213O	Stream	Stj Riv Ab Oklawaha R	Good			
2213P	Stream	Ortega River	Fair	Stable	Low	Nutrients, Coliforms, Lead, Copper, Total Suspended Solids
2220	Stream	Ninemile Creek	Poor			
2223	Stream	Trout River	Fair			
2228	Estuary	Moncrief Creek	Fair		High	Coliforms, Iron, Copper, Nutrients
2232	Stream	Sixmile Creek Reach	Fair			
2238	Stream	Little Sixmile Creek	Poor			
2239	Stream	Strawberry Creek	Poor		Low	Dissolved Oxygen, Coliforms, Nutrients, Copper
2249A	Stream	Ortega River	Fair	Improving		
2249B	Stream	Mcgirts Creek	Good			
2262	Stream	Cedar River	Poor	Stable	High	Dissolved Oxygen, Coliforms, Nutrients, Turbidity
2262A	Stream	Mccoys Creek	Fair		High	Lead, Copper, Zinc, Nutrients, Total Suspended Solids
2265A	Estuary	Arlington River	Good	Stable	Low	Nutrients, Lead, Copper
2265B	Stream	Pottsburg Creek	Fair		Low	Coliforms, Nutrients, Copper, Turbidity

[1] The table identifies the watersheds (by name, waterbody type, and ID Number) in the Lower Suwannee River Basin that were assessed in 1998. Water Quality determinations for status and trend have been provided for each watershed. Watersheds with TMDL waterbodies are listed and the 1998 priority provided.

Waterbody ID	Waterbody Type	Waterbody Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
2282	Stream	Willis Branch	Poor		High	Copper, Nutrients, Turbidity, Total Suspended Solids, Dissolved Oxygen, Coliforms
2283	Estuary	Pablo Creek	Fair			
2309	Stream	Rowell Creek	Good			
2310	Blackwat	Caldwell Branch	Good			
2316	Stream	Williamson Creek	Poor		High	Dissolved Oxygen, Coliforms
2322	Stream	Butcher Pen Creek	Poor		High	Coliforms, Copper, Nutrients, Turbidity, Total Suspended Solids, Dissolved Oxygen
2323	Stream	Yellow Water Creek	Good			
2324	Stream	Fishing Creek	Poor		High	Dissolved Oxygen, Copper, Nutrients, Turbidity, Total Suspended Solids
2326	Stream	Goodbys Creek	Fair	Stable	High	Nutrients, Turbidity, Total Suspended Solids, Biochemical Oxygen Demand, Colifoms
2327	Stream	Sal Taylor Creek	Good			
2342	Blackwat	Long Branch	Fair			
2351	Stream	Julington Creek	Poor		Low	Dissolved Oxygen, Coliforms, Nutrients, Turbidity, Total Suspended Solids
2356	Stream	Big Davis Creek	Fair	Stable	Low	Dissolved Oxygen, Nutrients, Selenium
2365	Stream	Durbin Creek	Poor	Stable	High	Dissolved Oxygen, Selenium, Nutrients, Coliforms
2368	Blackwat	Little Black Creek	Good		Low	Dissolved Oxygen, Coliforms, Iron
2381	Stream	Cormorant Creek	Poor			
2386	Stream	North Fork Black Creek	Good			
2386A	Stream	North Fork Black Creek	Good	Stable		
2389	Lake	Doctors Lake	Fair	Stable	Low	Dissolved Oxygen, Coliforms, Nutrients, Selenium, Cadmium, Lead, Silver
2390	Blackwat	Gum Branch	Good			
2403	Stream	Big Branch	Good			
2404	Stream	Cunningham Creek	Fair			
2407	Stream	Grog Branch	Fair		Low	Dissolved Oxygen, Coliforms, Turbidity, Iron, Total Suspended Solids
2410	Stream	Swimming Pen Creek	Fair	Stable	Low	Nutrients, Lead, Cadmium, Silver, Zinc, Total Suspended Solids
2411	Stream	Sixmile Creek	Fair	Stable	Low	Dissolved Oxygen, Nutrients, Lead, Silver
2415A	Stream	Black Ck Ab Stjr	Poor			
2415B	Stream	Black Creek	Good	Stable	Low	Dissolved Oxygen, Iron, Lead, Cadmium, Silver
2415C	Stream	Black Creek S.Fork	Good	Stable	Low	Dissolved Oxygen, Coliforms, Nutrients, Iron, Lead, Silver
2415D	Stream	Black Creek S.Fork	Good			
2415E	Stream	Black Creek So Fork	Good			
2415F	Lake	Varnes Lake	Good			
2415G	Lake	Lake Whittmore	Good			
2423	Stream	Mill Log Creek	Fair			
2431	Stream	Trout Creek	Good	Stable		
2434	Stream	Mill Creek	Fair			
2438	Lake	Lake Ashbury	Good			

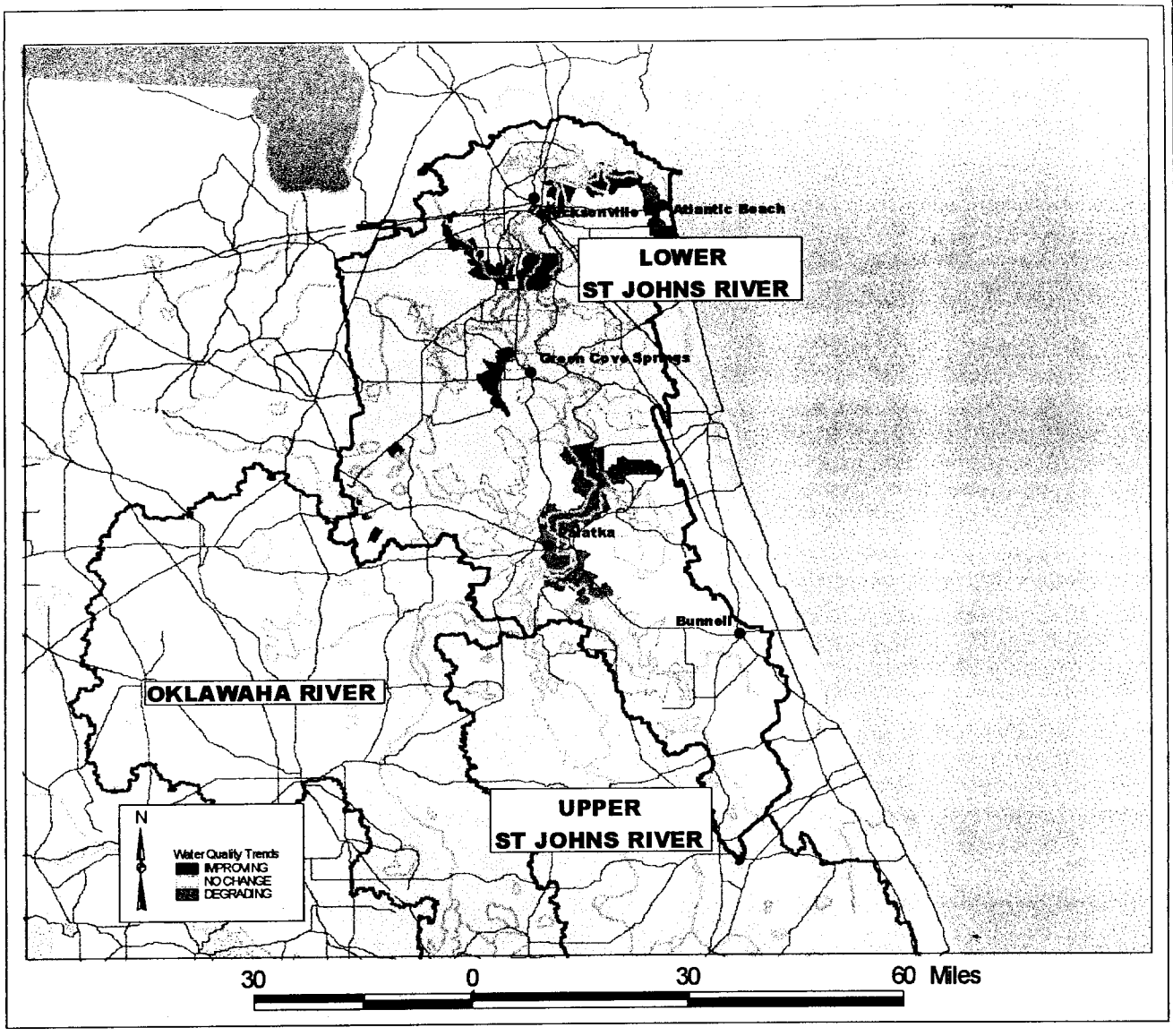
Waterbody ID	Waterbody Type	Waterbody Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
2444	Stream	Peters Creek	Fair	Improving	Low	Dissolved Oxygen, Iron, Lead, Cadmium, Silver, Nutrients, Coliforms
2460	Stream	Mill Creek	Poor		Low	Dissolved Oxygen, Coliforms, Nutrients, Turbidity, Iron
2476B	Lake	Kingsley Lake	Good	Stable		
2478	Stream	Greene Creek	Fair		Low	Coliforms, Nutrients, Biochemical Oxygen Demand
2485	Stream	Ates Creek	Good			
2492	Stream	Tocoi Creek	Fair		Low	Dissolved Oxygen, Nutrients
2503	Stream	Clarkes Creek	Good			
2509	Lake	Lake Geneva	Good	Stable		
2509A	Lake	Paradise Lake	Good			
2509B	Lake	Bedford Lake	Good			
2509D	Lake	Crystal Lake	Good	Stable		
2509E	Lake	Lake Swan	Good	Stable		
2509F	Lake	Little Keystone Lake	Good			
2509G	Lake	Lake Opal	Good			
2509H	Lake	Lily Lake	Good	Improving		
2509I	Lake	Lake Brooklyn	Good	Stable		
2509J	Lake	Lake Rosa	Good	Degrading		
2509K	Lake	Lake Lowry	Good			
2511B	Stream	Simms Creek	Good	Stable		
2528	Lake	Lake Johnson	Good			
2528A	Lake	Smith Lake	Good			
2528B	Lake	Lake Sheelar	Good	Degrading		
2528D	Lake	Lake Gator Bone	Good			
2528E	Lake	White Sand Lake	Good			
2528F	Lake	Pebble Lake	Good			
2528G	Lake	Gold Head Lake	Good			
2538	Stream	Cedar Creek	Good			
2540	Stream	Moccasin Branch	Poor		High	Dissolved Oxygen, Iron, Lead, Silver, Nutrients, Biochemical Oxygen Demand
2541	Lake	Georges Lake	Fair	Stable		
2543A	Stream	Etonia Creek	Good	Stable		
2543C	Lake	Lake Tucker	Good			
2543D	Lake	Ashley Lake	Good			
2543F	Lake	Lake Ross	Good			
2543G	Lake	Goose Lake	Good			
2545	Stream	Salt Creek Ditches	Poor			
2549	Stream	Deep Creek	Fair	Stable	High	Dissolved Oxygen, Iron, Lead, Cadmium, Copper, Silver, Nutrients, Biochemical Oxygen Demand
2555	Stream	Cracker Branch	Poor		High	Dissolved Oxygen, Nutrients, Biochemical Oxygen Demand
2565	Lake	Boyds Lake	Good			
2567A	Stream	Rice Creek	Poor	Stable	High	Dissolved Oxygen, Iron, Lead, Cadmium, Silver, Nutrients, Turbidity, Total Suspended Solids, Biochemical Oxygen Demand
2567B	Stream	Rice Creek	Fair	Stable	Low	Coliforms, Nutrients, Iron, Lead
2569	Stream	West Run Intercepter D	Poor		High	Dissolved Oxygen, Iron, Silver, Nutrients, Turbidity, Total Suspended Solids, Biochemical Oxygen Demand

Waterbody ID	Waterbody Type	Waterbody Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
2574	Lake	Twomile Pond Outlet	Good			
2575	Lake	Cue Lake Outlet	Good			
2582	Lake	Lake Suggs Outlet	Good			
2582A	Lake	Rowan Lake	Good			
2582B	Lake	Long-Lons Lake	Good	Improving		
2587	Lake	Grandin Lake Outlet	Good	Stable		
2587A	Lake	Clearwater Lake	Good			
2589	Stream	Sixteenmile Creek	Fair	Stable	Low	Dissolved Oxygen, Nutrients
2592	Stream	Mill Branch	Poor		High	Dissolved Oxygen, Coliforms, Nutrients, Turbidity, Biochemical Oxygen Demand
2596	Stream	Levys Prairie	Good			
2601	Lake	Round Lake	Good			
2605	Stream	Cross Florida Barge Ca	Good			
2606A	Stream	Dunns Creek	Fair	Degrading		
2606B	Lake	Crescent Lk	Fair	Stable		
2615	Stream	Bull Creek Ditches	Fair			
2615A	Lake	Dead Lake	Fair			
2617	Lake	Lake Broward Outlet	Good	Stable		
2622A	Stream	Haw Ck Ab Crescent Lk	Fair	Stable	High	Nutrients, Iron, Coliforms, Lead, Selenium, Silver, Dissolved Oxygen, Biochemical Oxygen Demand
2622B	Stream	Haw Creek	Good			
2622C	Lake	Gore Lake	Good			
2625	Lake	Lake Stella Outlet	Good			
2625A	Lake	Omega Lake	Good			
2625B	Lake	English Lake	Good			
2629	Stream	Middle Haw Creek	Good			
2630A	Blackwat	Little Haw Creek	Good		High	Dissolved Oxygen, Coliforms, Iron, Lead, Selenium
2630B	Lake	Lake Disston	Good	Stable		
2630D	Lake	North Talmadge Lake	Good			
2630E	Lake	Lindley Lake	Good			
2630F	Lake	Charles Lake	Good			
2630G	Lake	Blue Lake	Good			
2659	Lake	Lake Winona Outlet	Good	Stable		
2667	Lake	Lake Dias Outlet	Good			
2671	Lake	Lake Daugharty Outlet	Good			



Water Quality - Status
Lower St. Johns River Basin
HUC Number 03080103
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauxe;
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section



Water Quality - Trends
Lower St. Johns River Basin
HUC Number 03080103
1998 Water Quality Assessment

Map prepared September 1998 by J. Hand and V. Tauxe
Department of Environmental Protection,
Division of Water Facilities, Basin
Planning and Management Section

Indian River Lagoon Basin

Water Quality Summary

The Indian River Lagoon system has generally sluggish water circulation patterns, which make it susceptible to nutrient overenrichment and turbidity impacts. Increased nutrient loads in the basin from urban growth and increased treated sewage discharges have resulted in water quality degradation, as seen in loss of seagrass beds and declining harvest of fish. More recently, many domestic wastewater facilities have reduced or eliminated discharges to the lagoon and nutrient levels in the lagoon system are decreasing.

Improvements are occurring throughout the Indian River Lagoon, as evidenced by a lowering of nitrogen and phosphorus levels. Trend data for the basin indicates that most of the 30 assessed waterbodies are stable or improving, with 33% improving and 67% stable. Of the assessed waterbodies, none showed a degrading trend.

The Hydrologic Unit identified as South Indian River contains 8 303(d) listed waters (Belcher Canal/Taylor Creek, South Indian River (2 segments), Sebastian River (2 segments), Felsmere Canal, C-54 Canal, and North Prong Sebastian River) and the middle East Coast Basin contains twenty 303(d) listed waters.

The South Florida and St. Johns River Water Management Districts are currently studying salinity in the Indian River Lagoon with hopes of developing an ecological salinity target for the estuary.

Basin Description

The Indian River Lagoon system is composed of two surface water basins (south Indian River and Middle East Coast) and three interconnected estuarine lagoons: Mosquito Lagoon, Indian River Lagoon, and the Banana River Lagoon. It extends from Ponce de Leon Inlet in Volusia County southward for 155 miles to Jupiter Inlet in Palm Beach County. The system, bounded on the east by a narrow coastal ridge, is shallow and narrow, with an average depth of 4 feet and a width that varies from 0.2 to 5.5 miles (St. Johns River Water Management District, 1994).

Indian River Lagoon is only slightly less saline than the ocean. Its freshwater comes from coastal drainage and canal systems, Sebastian Creek, and several large canal systems to the west. The system has three ocean inlets (at Sebastian, Ft. Pierce, and St. Lucie), as well as six bridges.

A summary of key basin characteristics includes:

Drainage Area	1542 square miles
Major Land Uses	agriculture, range land, urban development, industrial
Population Density	moderate to moderately high in central basin
Major Cities	Titusville, Cocoa, Cape Kennedy, Melbourne, Edgewater, New Symrna, Vero Beach, Sebastian, Fort Pierce
Major Counties	Brevard, Indian River, Martin, St. Lucie, Volusia
Major Tributaries	Sebastian Creek, Indian River, Banana River
OFW Waterbodies	Indian River; Vero Beach to Ft. Pierce State Aquatic Preserve; Jenson Beach to Jupiter Inlet State Aquatic Preserve, most of Mosquito Lagoon and Banana River, Indian River Aquatic Preserve, Pelican Island National Wildlife Refuge, Canaveral National Seashore

SWIM Waterbodies	Indian River Lagoon System
Origin of Basin Water	Sebastian Creek, canal systems, Banana River, rainfall, groundwater inflow
National Estuary Program	Indian River Lagoon

Hydrogeologic Description

- Circulation in the lagoon system is generally sluggish except during large storms and in areas near inlets. Because of this, the Indian River Lagoon is naturally susceptible to nutrient over-enrichment and turbid conditions.
- In their natural state, the lagoons are bordered by mangrove swamp or Spartina marsh and have lush seagrass growth along their bottoms. Mosquito Lagoon and Turnbull Bay retain much of their native vegetation, as does much of the southern part of the basin.
- The principal hydrogeologic units within the Indian River Basin are the surficial aquifer system, intermediate confining unit, and the Floridan aquifer system.
- In the northern portion of the basin (Southeastern Volusia County), the Floridan aquifer system is the main source of potable water. Moving southward the Floridan aquifer becomes more highly mineralized, limiting its uses to agricultural purposes.
- From Brevard County southward, the surficial aquifer is the principal source of ground water for municipal, industrial, commercial, and domestic use.
- The surficial aquifer is under unconfined conditions. This unit is composed primarily of sand, but contains thin beds or lenses of limestone, sandstone, and shell.
- The surficial aquifer is recharged primarily from local rainfall, and by leakage upward from the Floridan aquifer below. Discharge occurs to local streams, rivers, man made canals, and eastward into the Atlantic Ocean.

Water Quality Status

The following information is from the 1996 305(b) report:

- The southernmost part of the Indian River has very good water quality, except near Turkey and Crane Creeks and the Eau Gallie River.
- Although water quality has been good, especially south of the Ft. Pierce Inlet, concern is growing over the estuary's degradation.
- Sebastian Creek has poor water quality. The creek's South Prong has a history of elevated bacterial and biochemical oxygen demand from dairy farms and rangeland runoff. Its water quality recently improved when runoff from one of the dairies was removed.
- The Banana River's worst water quality is in Sykes Creek and Newfound Harbor in southern Merrit Island, which have had algal blooms, seagrass dieoffs, and occasional fish kills. Historically, several poorly operating wastewater treatment plants discharged to Sykes Creek. Although the plants were upgraded and no longer discharge, the creek still has high levels of nutrients and chlorophyll, low transparency, and water quality is worsening.
- The northern part of Merritt Island and the Banana River, which are part of the Kennedy Space Center and sparsely developed, have good water quality.
- Mosquito Lagoon is wide and shallow and fairly well mixed by wind, which accounts for its lack of transparency and high nutrient levels.

Water Quality Trends

- 30 waterbodies were assessed for trends – 33% are improving and 67% are stable. No degrading trends were found.
- Improvements are occurring throughout the Indian River Lagoon, as evidenced by a lowering of nitrogen and phosphorus levels. The lower nutrient levels are likely a result of the Indian River Lagoon (IRL) Act of 1991, which required domestic wastewater dischargers to eliminate or in the case of some wet weather dischargers, significantly reduce their nutrient loading to the system.

Point and Nonpoint Sources of Pollution

The Indian River Lagoon System is part of the National Estuary Program (NEP). A list of priority issues has been identified by the NEP. These include:

- increased nutrient loading
- increased suspended solids
- altered circulation and flushing patterns
- loss of seagrass beds
- loss of submerged and emergent wetlands
- increased number of pathogens
- lack of consistent resource management
- lack of regulation and enforcement

These problems were created by the following human activities:

- Rapidly increasing human population is the underlying cause of nearly all the damage sustained by the Indian River Lagoon System. The effect of human population growth on the habitats of the Indian River Lagoon System are seen in the substantial loss of seagrass beds in the lagoon, and declining annual harvests of fish.
- Construction of causeways across the lagoon has interrupted water flow, altering natural water flow.
- Dredging of canal for safe boat navigation through the lagoon has covered seagrasses with silt, and created areas too deep for seagrasses to colonize.
- Large scale flood control and drainage programs began in 1916. Nearly all natural streams in the area have been ditched and rerouted to create dry land for farming and development. Natural groundwater tables are permanently lowered, and the increased freshwater input from the canals to the lagoon has drastically altered the water balance of the lagoon. Stormwater runoff into the canals travels quickly to the Indian River Lagoon.
- Impounding of 40,000 acres of salt marshes for mosquito control has killed the natural salt marsh vegetation.

The 1996 305(b) report has identified specific water quality problems within the Indian River Lagoon System:

- Around Vero Beach, the Indian River is polluted mainly by nutrients. Potential sources include historic loading from wastewater treatment plants (no longer discharging), urban runoff, drainage from septic tanks, and drainage from relief canals, which carry large quantities of runoff from orange groves, streets, and houses west of the lagoon.
- In the southern part of the basin, urban runoff from waterfront development causes most of the pollution. At Ft. Pierce, the estuary also receives nutrients and excess freshwater from Belcher Canal, which drains orange groves, rangeland, and urban areas. Ft. Pierce operates a wastewater treatment plant that discharges to the western edge of Ft. Pierce Inlet.
- There are several problem areas in the vicinity of Melbourne. Turkey Creek has a variety of pollution sources, including a drainage canal from the St. Johns River Basin and urban runoff from Melbourne. Eau Gallie River receives urban runoff.
- Another major pollution source is the developed Rockledge/Cocoa area, which contributes nutrients and biochemical oxygen demand from wastewater plants and urban runoff.
- The middle part of the Indian River from Titusville to Cocoa has poor water quality along the developed western side because of effluent from two Titusville wastewater plants, significant urban runoff from a canal system, and several causeway bridges that limit water circulation.
- Port Canaveral, a man-made harbor that connects the Banana River to the Atlantic Ocean through a series of locks, receives pollution from shipping traffic discharges and several seafood processing businesses. Several cruise ships in Port Canaveral have also been cited for improper sewage disposal.

Reference Reports

- Water Quality Assessment for the State of Florida – 305(b) Report (with five technical appendices), Florida Department of Environmental Protection, Bureau of Surface Water Management, 1996
- Indian River Lagoon National Estuary Program, 1998, INTERNET Site http://www.epa.gov.OWOW.oceans.lagoon/
- Indian River Lagoon Surface Water Improvement and Management (SWIM) Plan, St. Johns River Water Management District, 1994

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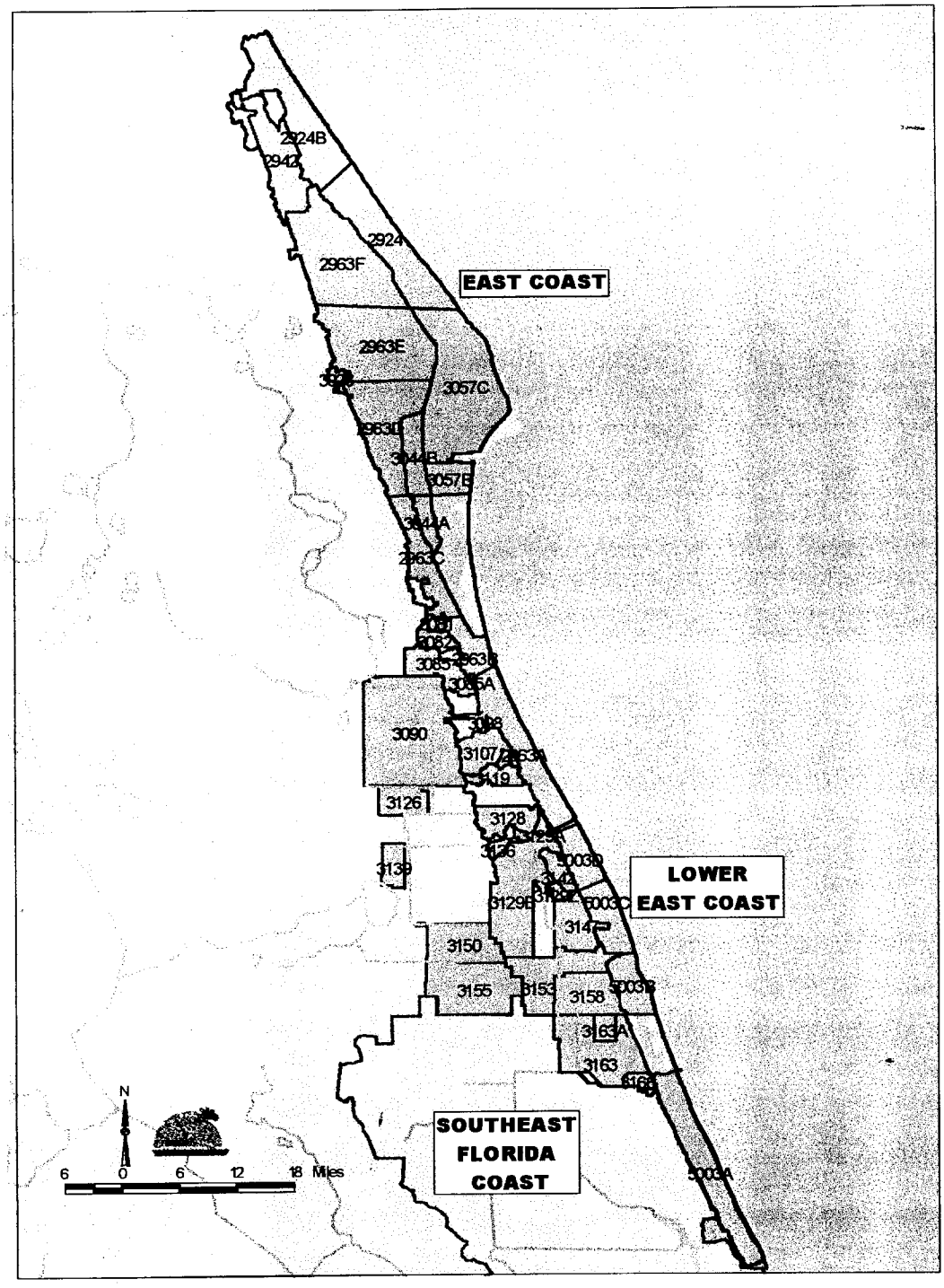


Indian River Basin

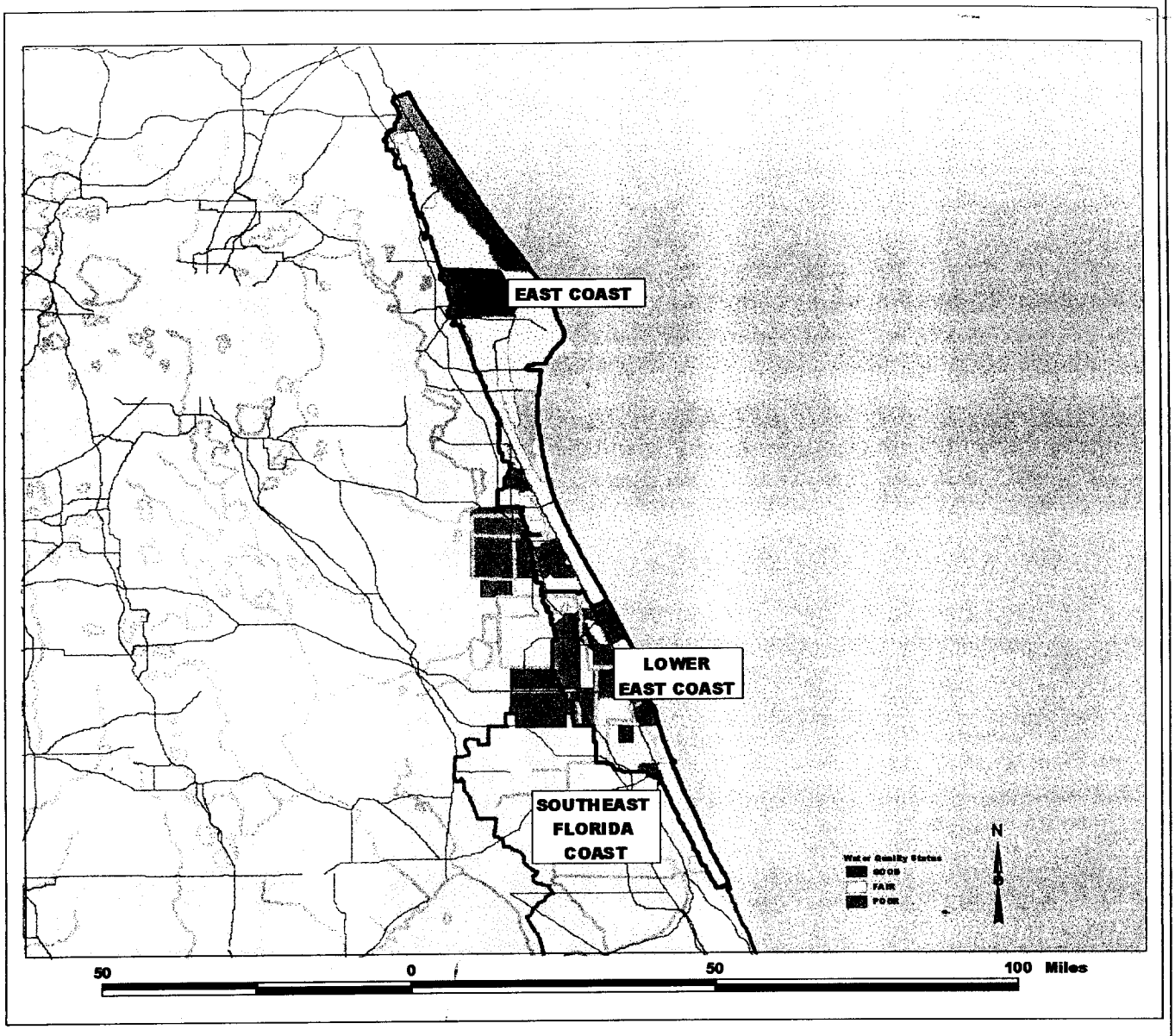
Assessed Watersheds in the Indian River Lagoon Basin

Assessed Watersheds in the Indian River Lagoon Basin[1]

Waterbody ID	Waterbody Type	Watershed Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
2924	Estuary	Mosquito Lagoon	Good	Stable		
2924B	Estuary	Mosquito Lagoon	Good	Improving	Low	Coliforms
2942	Stream	Turnbull Creek	Fair			
2963A	Estuary	Indian R. Ab Seb Inlet	Fair	Stable	High	Dissolved Oxygen, Silver, Lead, Cadmium, Selenium, Thallium, Nutrients, Mercury (Based on Fish Consumption Advisory)
2963B	Estuary	Indian R. Ab Melb Cswy	Fair	Improving	High	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
2963C	Estuary	Indian R. Ab Melb Cswy	Fair	Improving	High	Nutrients, Mercury (Based on Fish Consumption Advisory)
2963D	Estuary	Indian R. Ab 520 Cswy	Fair	Improving	High	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
2963E	Estuary	Indian R. Ab Nasa Cswy	Good	Stable	Low	Dissolved Oxygen
2963F	Estuary	Indian R. Ab M. Brewer	Fair	Stable	Low	Iron, Lead
3028	Stream	Addison Creek	Good	Stable	High	
3044A	Estuary	Newfound Harbor	Fair	Stable	Low	Dissolved Oxygen, Nutrients
3044B	Estuary	Sykes Creek/Barge Can.	Fair	Improving	Low	Dissolved Oxygen, Nutrients
3057B	Estuary	Banana R. Ab 520 Cswy	Fair	Stable	High	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
3057C	Estuary	Banana R. Ab Barge Can	Fair		Low	Dissolved Oxygen
3081	Stream	Horse Creek	Poor		Low	Dissolved Oxygen
3082	Estuary	Eau Gallie River	Poor	Stable	High	Coliforms, Iron, Nutrients
3085	Stream	Crane Creek	Fair	Stable	High	Dissolved Oxygen, Coliforms, Nutrients
3085A	Estuary	Crane Creek	Fair	Improving	High	Iron, Nutrients
3090	Stream	Drained Farmland	Good		Low	Dissolved Oxygen, Nutrients, Iron, Lead, Cadmium

[1] The table identifies the watersheds (by name, waterbody type, and ID Number) in the Lower Suwannee River Basin that were assessed in 1998. Water Quality determinations for status and trend have been provided for each watershed. Watersheds with TMDL waterbodies are listed and the 1998 priority provided.

Waterbody ID	Waterbody Type	Watershed Name	1998 Status	1998 Trend	1998 TMDL Priority	Parameters of Concern
3098	Estuary	Turkey Creek	Fair	Stable	High	Dissolved Oxygen, Nutrients
3107	Estuary	Goat Creek	Good		Low	Dissolved Oxygen, Nutrients
3115	Stream	Kid Creek	Good			
3119	Stream	Trout Creek	Good			
3126	Stream	Drained Farmland	Poor			
3128	Stream	No. Prong Sebastion R	Fair	Stable	High	Dissolved Oxygen, Copper, Nutrients, Turbidity, Total Suspended Solids
3129A	Estuary	Sebastion R. Ab Ind R.	Fair	Stable	High	Dissolved Oxygen, Nutrients
3129B	Stream	Sebastion River	Poor	Stable	High	Dissolved Oxygen, Iron
3129X	Stream	Dr Ditch To Seb Ck X	Poor			
3129Y	Stream	Dr Ditch To Seb Ck Y	Fair			
3129Z	Stream	Dr Ditch To Seb Ck Z	Poor			
3135	Estuary	C-54 Canal	Fair	Stable	High	Dissolved Oxygen, Nutrients
3136	Stream	Felsmere Canal	Fair		High	Dissolved Oxygen, Nutrients, Total Suspended Solids
3139	Stream	Drained Farmland	Fair	Improving		
3142	Stream	Unnamed Canal	Fair			
3147	Stream	North Canal	Good			
3150	Stream	Drained Farmland	Good	Improving		
3153	Stream	Main Canal	Good	Stable		
3155	Stream	Drained Farmland	Good			
3158	Stream	South Canal	Fair			
3163	Estuary	Belcher Can/Taylor Ck	Fair	Stable	High	Dissolved Oxygen, Nutrients
3163A	Lake	Lakewood Park Lakes	Good	Stable		
3166	Estuary	Moore Creek	Good	Improving		
5003A	Estuary	South Indian River	Fair	Stable		
5003B	Estuary	South Indian River	Good	Stable		
5003C	Estuary	South Indian River	Fair	Stable	High	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)
5003D	Estuary	South Indian River	Good	Improving	High	Dissolved Oxygen, Nutrients, Mercury (Based on Fish Consumption Advisory)



Water Quality - Status
Indian River Basin
HUC Numbers 0380202 and 03080203
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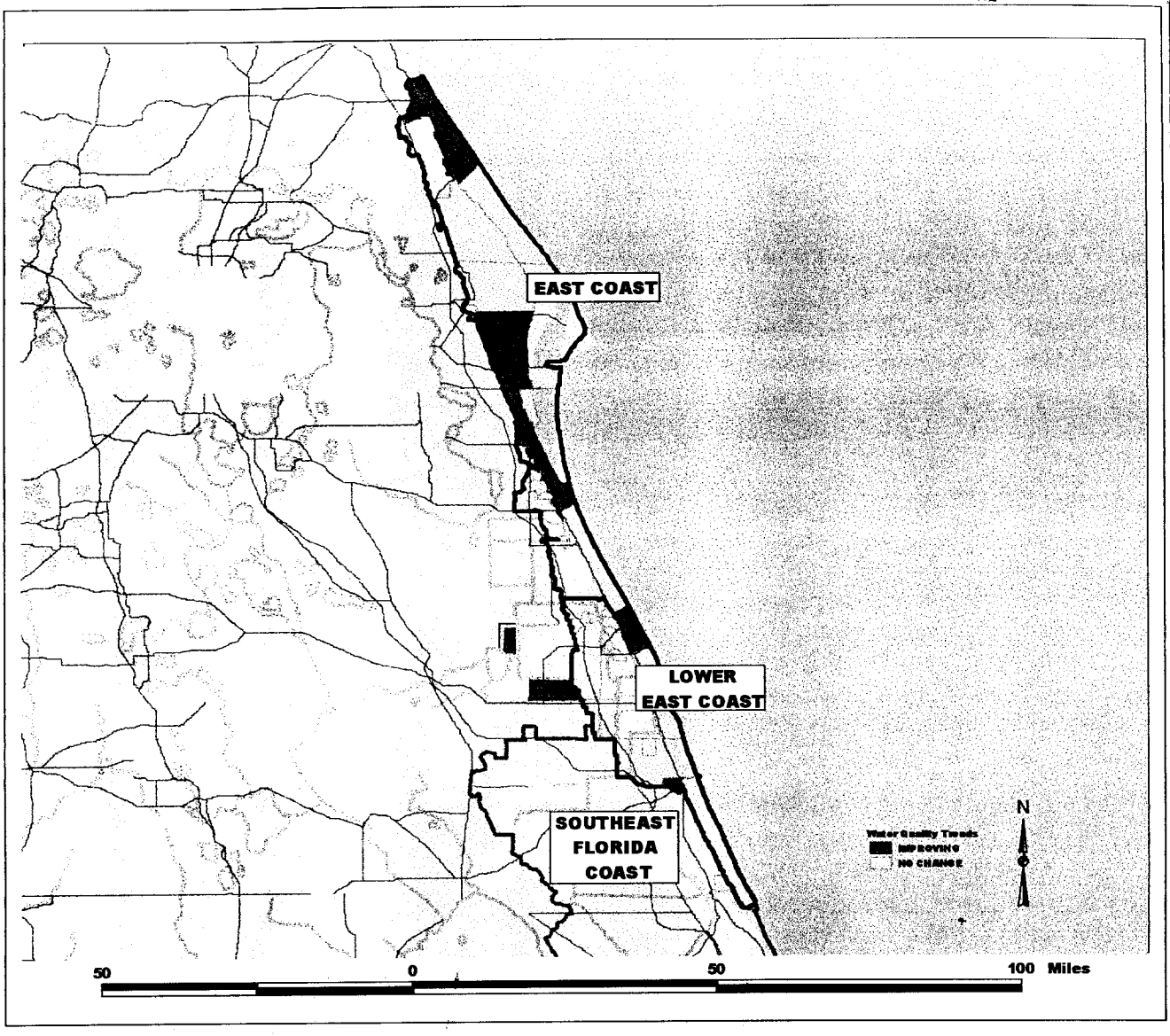

Water Quality - Trends
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